THE PATHOLOGICAL
GALL·BLADDER

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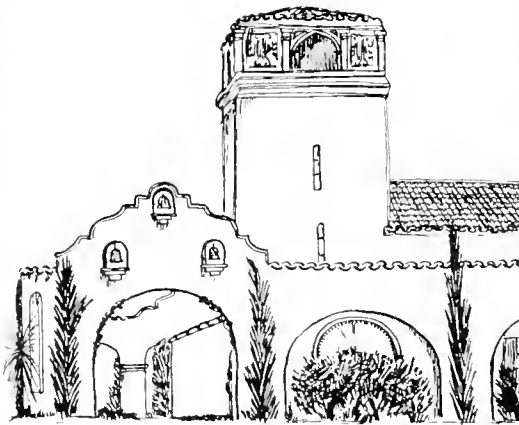
THE PATHOLOGICAL GALL-BLADDER

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ANNALS OF ROENTGENOLOGY

VOLUME TWO

ANNALS OF ROENTGENOLOGY
A SERIES OF MONOGRAPHIC ATLASES

EDITED BY JAMES T. CASE, M. D.
Ex-President of The American Roentgen Ray Society

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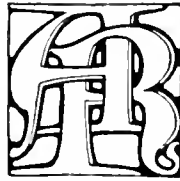
Arial W. George, M.D.

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ROENTGENOLOGICALLY CONSIDERED

ONE HUNDRED AND THIRTY-FIVE ROENTGEN RAY STUDIES
ON FORTY-FOUR FULL PAGE PLATES, THREE OF WHICH ARE PHOTOGRAPHIC
AND TWO TEXT ILLUSTRATIONS

BY

ARIAL W. GEORGE, M.D.

AND

RALPH D. LEONARD, A.B., M.D.

BOSTON, MASSACHUSETTS

DEDICATED

TO

DR. PERCY BROWN

OUR FRIEND AND COLLEAGUE

EDITOR'S PREFACE

IT is too much to expect that any man can be a specialist in all of the branches of medicine in which roentgenology plays a useful part. True, one finds here and there an exception who, because of a specially fortunate series of events and an unusually large clinical experience, is endowed with great usefulness as a roentgenologist with a broad viewpoint; but the average physician working with the roentgen rays, even if he restricts his practice to the use of this newer diagnostic and therapeutic arm, feels keenly his lack of training and experience in many of the branches of medicine in which his roentgenologic aid is sought. Again and again in the presence of a case in one of the less familiar lines, he will find himself longing to make comparison with roentgenograms of some proven case of a similar nature, wondering what roentgenologic pitfalls he must avoid. He may recall having seen some similar case in a postgraduate course but his memory of the plate details is too hazy for reliance.

The scope of the roentgenologist's judgment is measured by the experience he can fall back upon. It is to supply a diagnostic guide rich in the fruit of experience of leading authorities in special fields of x-ray that the Editor and the Publisher have conceived the production of this series of monographic atlases, to bring to the roentgenologist at home a postgraduate course from the very men whom he would seek in personal visit, and to leave with him an invaluable series of master roentgenograms which he may study and with which he may make comparisons as often as desired.

BATTLE CREEK, MICHIGAN.   JAMES T. CASE.

PREFACE

IT was with a great deal of trepidation that we attempted to compile the material that is presented in this monograph, realizing the many problems involved in the study of the pathological gall-bladder. But we felt by presenting, in our own way, the problems which have come to us in the study of this subject, that perhaps it would become simpler for others who wish to take up this work.

The importance of the study of the pathological gall-bladder by the x-ray is so great that this alone must be our apology for offering these facts. All our colleagues who have attempted to carry on this work realize with us the difficulty in trying to reproduce photographically the more definite findings of the photographic plate or film, and we realize better perhaps than anyone that the plates that are reproduced in this monograph are not as excellent as they can be made, but represent the cases as we, with our facilities, were obliged to take them.

One must keep constantly in mind that we are dealing frequently with almost negligible shadow values. We have come to expect even in the most definite cases, hardly discernible shadows on the x-ray plate or film, and when attempt is made to reproduce these, they are, in a good many instances, of no value for this purpose.

The writers have tried to approach the problem from every angle met with in their experience, giving as definitely as possible the ways and means by which they interpret the plates or films of the upper right quadrant and classifying the many apparently simpler facts which have later become important in the diagnosis. Purposely, the writers have tried to choose for this monograph the difficult plates of gall-stones and of the pathological

PREFACE

gall-bladder, trying to cover the problem in its most difficult aspect, rather than choosing the plates that show stones and the gall-bladder without a great deal of effort.

It is the ambition of the writers that this monograph on the subject of the pathological gall-bladder will arouse interest in those who have not been interested, and renew the interest of those who have been discouraged by failures. If these facts which are set forth in the following pages accomplish this, the writers will feel amply repaid for bringing this study before their colleagues. It is hoped that this work will be received in the same spirit in which it is offered by the writers, though they realize more than anyone can that it will fall far short of what they hoped for, and what necessarily the future must hold for this special study.

To obtain the clinical material for carrying on this investigation would have been impossible without the help of our medical and surgical colleagues. It has been their untiring interest, in spite of our failures, in individual cases, and their readiness to grasp the possibilities of this study and not the least their appreciation of the need of such assistance that has made this work possible.

The writers wish to express their appreciation of the help of these friends.

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THE PATHOLOGICAL GALL-BLADDER
ROENTGENOLOGICALLY CONSIDERED

INTRODUCTION

I N 1910 we had the privilege of visiting the various gastro-intestinal clinics of Europe. It was obvious to any observer who hoped to make an accurate study of the lesions of the gastro-intestinal tract that the continental method of study was lacking in something to make it complete. No effort was being made to solve the gall-stone problem, except in some slight experimental way. It was openly taught that gall-stones could not be demonstrated in a great majority of cases.

On returning to this country and seeing the work of Lewis Gregory Cole, to whom more than any other individual we are indebted for the stimulation to carry on this work, we observed that in his direct study of the duodenum by the plate method, he was incidentally visualizing gall-stones in a large number of cases. It was clear that the reason for this lay in the fact, that by perfecting his plate technique to such a point as to bring out the slight changes in the duodenum, he thereby made clear the faint and obscure shadows of any gall-stones which happened to be present. Hence, when we took the opportunity to study ulcer of the duodenum by our modification of Cole's method, we also began to see gall-stones with increasing frequency. At once our interest became centered on the gall-stone problem. We became ambitious to show as many stones as possible, and became curious as to what percentage of all gall-stones could be demonstrated. We made several attempts at a statistical study. While realizing at the time how figures lie and that such studies were almost valueless, yet we hoped, by presenting these statistics, to arouse in other roentgenologists an active interest in this

problem. We expected, by stimulating a universal study of the right upper quadrant, to arrive, as time went on, at a higher percentage of correct diagnoses.

This work was carried on until 1917. At this time we began to realize that there was a certain, and possibly a large percentage of cases actually having gall-stones, in which the character of the gall-stones was such that it was almost a physical impossibility to visualize the stones on the photographic plate. We were, therefore, forced to seek other evidence, besides the mere demonstration of stones, whereby a diagnosis of diseased gall-bladder could be established. Our attention was called in certain cases to a shadow in the right upper quadrant, having the size, shape, and position of the gall-bladder. This shadow, we inferred, represented a gall-bladder full of stones, no single stone being of sufficient density to cast a shadow.

Occasionally, a patient showing this shadow would be found at operation to have only a chronically inflamed gall-bladder without any stones. We then appreciated for the first time that the pathological gall-bladder might, under certain conditions, cast a shadow, even when no stones were present. Our observation as to the demonstration of the pathological gall-bladder we have considered the greatest step in advance toward the solution of the gall-bladder problem. Since 1917 the emphasis in our work has been placed on the visualization of the pathological gall-bladder and the demonstration of the results of gall-bladder disease on the surrounding organs.

In the earlier study of gall-stones by the use of the x-ray, one should not overlook the early demonstration of gall-stones by Beck of New York and Thurstan Holland of England. There have been a few roentgenologists who have from time to time emphasized the study of gall-stones by the roentgen method. Principally, among these investigators have been Cole of New York, Case of Battle Creek and Pfahler of Philadelphia, who have been of help to us personally in carrying on this work.   Dudley Roberts of New

York in the last few years has made a definite study of the pathological gall-bladder and gall-stones. Knox of England has been a great stimulus to all to continue this work. His experimental work on the varying densities and types of gall-stones should be studied carefully by all those who are interested in these problems. It is because of our appreciation of his work that we have omitted any consideration along these lines in this monograph, as it would be impossible to improve at the present time upon what Knox has already published.

Our work would have been much simpler if more of our colleagues had taken it up and given us the benefit of their observations; but there has been so little published upon this particular aspect of the study of the biliary tract that it has required a good deal of time on our part to accumulate facts and observations which would be of value. Considerable material has been published in the last ten years upon the experimental study of gall-stones, most of which has been studied outside the body or by placing the stones in different media, such as water, wood, paper and beef; and it has been the opinion of the writers that there has been no definite analogy between the experimental study of gall-stones in this way as compared with the study of gall-stones in the living. It would have been a very discouraging problem if the facts which have been deducted from the experimental study of gall-stones were criteria of what we should find in the living.

TECHNIQUE

THERE is nothing mysterious or complicated in the technique of roentgenographing a patient for gall-bladder disease. The simplest way is always the best way; hence, we have discarded in our method of procedure anything which has seemed an unnecessary complication.

Preparation of the Patient

As most of our gall-bladder examinations are made in conjunction with a general gastro-intestinal study, we allow nothing to be done in the way of preparation which would interfere with the study of the stomach or intestines. This rules out any violent purgation because of its effect on the motility of the intestinal tract, it being our endeavor to study patients in their usual habits of living. A cleansing enema, however, is desirable, in that it thoroughly cleans out the hepatic flexure area of the colon in the region of the gall-bladder, while not interfering with the subsequent intestinal motility.

More important is the requirement that the patient present himself for examination with an empty stomach. As our patients come in the morning, we recommend that they omit the breakfast. If this seems too much of a hardship, a little liquid such as tea, coffee, milk or bouillon may be taken at least two hours previous to the examination. This will obviate any tendency to faintness, particularly when the patient comes to the office from some distance. We are particular about the stomach being empty, for a food-filled antrum or duodenum may produce shadows simulating the gall-bladder or gall-stones.

It goes without saying, that all drugs should be omitted for at least two days previous to the examination. This is particularly true of medicine containing bismuth. It is surprising how long bismuth may adhere to the

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intestinal walls and if in the hepatic flexure region may produce confusing shadows in the right upper quadrant. When all is said and done, if shadows appear on the film which are suspicious but indefinite, one should not hesitate to repeat the examination on another day.

FILMS

The x-ray evidence of gall-bladder disease is of such a character as to require the use of films or plates for its demonstration. Our earlier work was done, of course, entirely with glass plates. The advent of the duplitized film about three years ago entirely superseded the use of plates in our office, since which time we have found no disadvantage in their use either for gall-bladder or general x-ray work.

In this connection, it may be said that throughout the text the words "plate" and "film" are used almost synonymously. Fluoroscopy has been of no practical value in this line of work; in fact, in some ways it has seemed an actual detriment to the perfection of gall-bladder diagnosis. Except by remote, indirect methods, there is nothing within the power of the fluoroscope to give the least information regarding the pathological gall-bladder. If all observers in this country had used the fluoroscope exclusively, a demonstration of gall-stones would have been the rarest observation, and the visualization of the gall-bladder unknown. Some of our colleagues who have had the best opportunities for studying large numbers of gastro-intestinal cases, have been of the least assistance in the solution of this problem, because their observations were confined mainly to the fluoroscope.

INTENSIFYING SCREENS

From the very beginning, the intensifying screen has been the foundation for our gall-bladder work. Without its use but little progress would have been made. It was found to be essential in obtaining that additional bit of

contrast so necessary to bring out the slight variations in the density of the gall-stones.

It is just at this point that many men have failed to achieve gratifying results. The difference in density between a gall-stone or gall-bladder and the surrounding tissue is so slight that it is frequently not detected on a straight plate or film, but may become visible when the intensifying screen is used. Those who persist in using straight films or plates (without the intensifying screen) will overlook a large percentage of gall-stones and pathological gall-bladders.

For years we have used the single screen and plate and have continually been bothered by the grain of the screen which seems to be accentuated in the plate. Furthermore, any defect in the screen is clearly reproduced on the plate, and many of these defects produce shadows simulating gall-stones. We attempted to eliminate these sources of error by using in each case a series of screens, so that before stating that gall-stones were present, the same shadows must be obtained throughout the series of plates.

With the development of the "double intensifying" screen and duplitized film, the sources of error from screen grain and defects are practically done away with. The defects of one screen are apparently offset by the good screen on the other side of the film. We feel today that not only is a screen necessary for gall-bladder work, but the best work requires a double screen used with a duplitized film. The double screen seems to increase twofold the advantages of the single screen and proportionately to diminish its faults.

TUBE AND TABLE

Experience has shown us that uniformly better results are obtained while using some type of Coolidge tube. The right degree of penetration, being of fundamental importance, can always be obtained with this tube. It is true that occasionally a very brilliant plate is obtained with the gas

tube, but on account of the uncertainty of the vacuum the duplication of excellent plates is difficult.

Other things being equal, the finer the focus the better the detail. As our technique requires a rather high milliamperage a too-fine focus tube may heat up. For general routine work the medium focus Coolidge tube has proved satisfactory, as well as the fine focus radiator type.

No special form of tube-stand is required. We prefer a small cone and diaphragm. The cone which we routinely use measures $5\frac{1}{2}$ inches in length, with a $3\frac{1}{2}$-inch diaphragm. The same is true of a table. As no unusual position of the patient is necessary, an ordinary horizontal table answers all purposes. In our office wooden tables are used, which incidentally do away with any static discharge.

STANDARD POSITION

We use a standard position. All cases are taken prone, the patient lying on the screen with the tube above. The screen is placed beneath the right upper quadrant so that it is bisected by the right costal margin.

The most practical sized screen to use is the 8- by 10-inch. It is possible to use a $6\frac{1}{2}$- by $8\frac{1}{2}$-inch or possibly a smaller one, but in using a screen that is too small one may overlook a gall-bladder if it is in an abnormal position.

The tube is placed above, the central ray perpendicular to the plate, using the smallest circle and cone which at a given distance will cover the plate. This is centered midway over the costal margin so that the exposure will give as much area above the costal margin as below it (Figs. 1 and 2).

The distance of the tube from the film and screen varies. Using a medium-focus tube, distance becomes of importance in bringing out sharpness of detail. With a fine-focus tube, distance is of less importance so far as detail is concerned; this also is the case for the radiator-type tube. The following rule holds true in gall-stone work just as in other x-ray work. If the

object being roentgenographed is an appreciable distance from the film, the tube must be a correspondingly greater distance away in order not to produce a distorted shadow. For instance, in a stout individual, where there may be several inches of abdominal fat between the gall-stone and the film, the
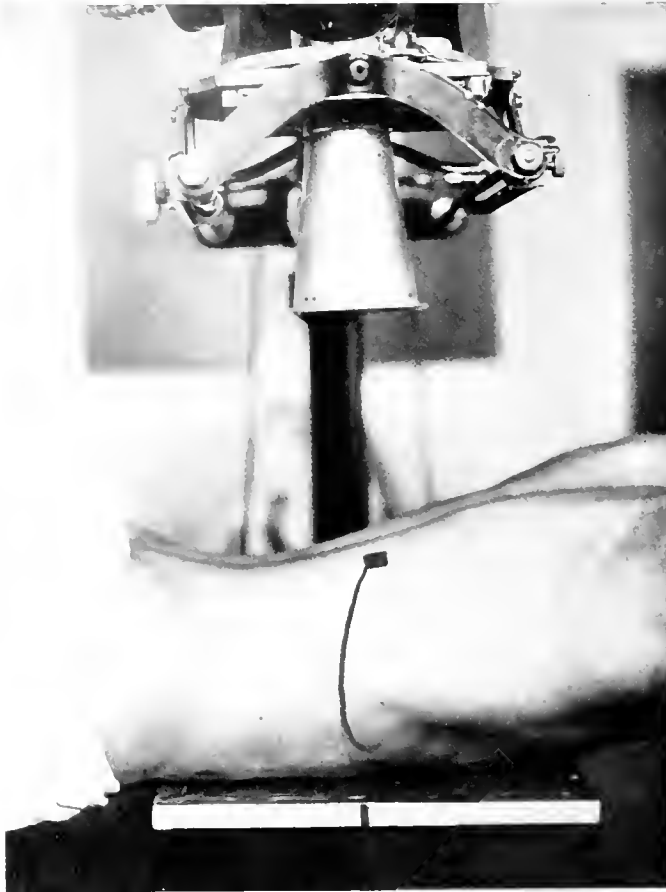

FIG. 1.

tube should be quite a distance away in order not to destroy the shadow by the divergence of the rays. Under ordinary circumstances, the tube should not be tilted or the angle changed. We are endeavoring to demonstrate a shadow as being constant in a series of films. If, now, the angle at

which the films are taken is changed, we thereby introduce a new variable factor which will cause a variation in the shadows on the film. If we observe on any one film a shadow which is suggestive of gall-bladder disease, we endeavor to visualize this shadow more clearly by changing the penetration and time of exposure, and not by changing the angle of the tube.
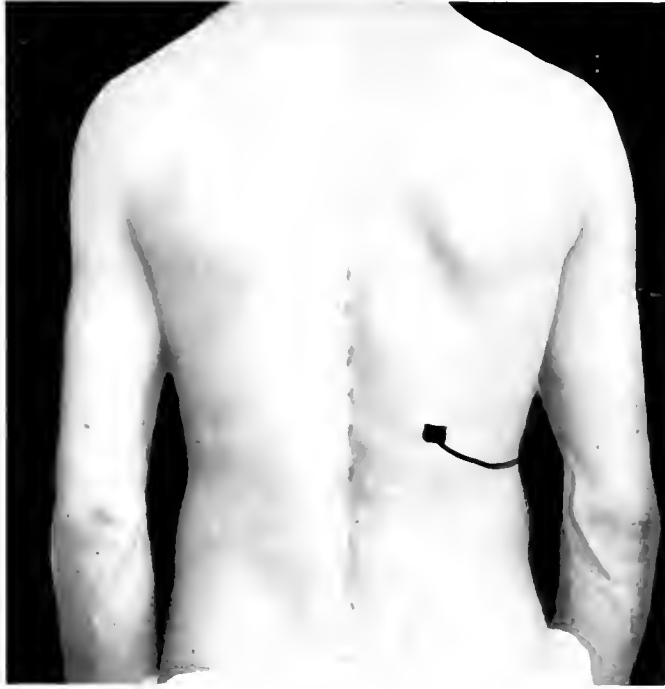
FIG. 2.

However, it may occasionally be necessary to change the angle of the tube in cases where apparent gall-stone shadows lie within the shadow produced by the spine. This condition may occur where there is a scoliosis, particularly with the curve toward the right. Postoperative cases may also present this condition as a result of adhesions.

Too much emphasis cannot be laid on this point of placing the tube so as to cover the area wanted and keeping it there, varying the technique only as may be required to improve the quality of the film. The patient must

be instructed to lie in one position (prone) and maintain that position throughout the entire examination. He should turn the head only from side to side, rather than turn the body to make his position more comfortable.

It sometimes seems advisable to change the screens under the patient by using a funnel or by putting them beneath the table, so as not to disturb the position of the patient. The disadvantage of this technique is that it is necessary to place the screen as close as possible to the patient. Every additional fraction of an inch that is interposed between the anterior abdominal wall of the patient and the intensifying screen adds to our difficulty by destroying detail.

POTTER-BUCKY DIAPHRAGM

The use of the Potter-Buckey diaphragm has materially helped in the study of all portions of the body to which it is applicable, and it has seemed from our experience that it should be of distinct advantage in the study of the right upper quadrant. This is particularly true in the muscular and well-nourished individuals. Unquestionably, when one understands the technique of the movable grid, more detail is brought out of the soft parts than without its use, especially in making visible the kidney, for example. The study of the visible gall-bladder also is simplified to a certain extent by its use, but one must understand the use of the grid and also realize that there is a certain amount of distortion that naturally comes from the use of this apparatus. Gall-stones which are difficult to make visible under ordinary routine technique, if care is used will stand out more brilliantly and with more contrast with the use of the grid. Its greatest help to us individually has been in the differentiation between gall-stones and renal stones, especially when using the lateral position. Shadows due to calcium which may or may not be gall-stones and with the ordinary technique would be difficult to make visible in the lateral view, seem to be clearer and more easily discernible when using the diaphragm.

We have not attempted to use the Potter-Buckey diaphragm routinely in the normal or the average-sized person. The distance between the film and the patient's abdominal wall and the necessarily slightly longer exposure required, are disturbing factors in obtaining the most satisfactory plates. It is hoped that as we gain more experience in the use of the Potter-Buckey diaphragm in the study of gall-bladder disease, we may find its use of increasing value.

PNEUMOPERITONEUM

It has not been our privilege to utilize the pneumoperitoneal injections for the study of the biliary tract. We have realized that it is possible to make clearly visible all gall-bladders, almost without exception, with the gas injection method; and undoubtedly stones which under ordinary circumstances would not be visible in the roentgen plate, can at least be suspected with the injection method. Its routine use for the study of the gall-bladder has not been attempted by us. It is only in the study for other conditions that occasionally we meet with conditions of the gall-bladder not suspected clinically or possibly not seen in a previous roentgen examination.

It is not the wish of the writers to deprecate the value of this method, but more to urge that the ordinary methods be better developed before one considers this new method, solely for the purpose of studying the biliary tract. Undoubtedly one will meet with cases in this study which would make the use of the pneumoperitoneum imperative, but the large majority of these cases that cannot be settled either by accepted clinical methods or by careful roentgen study would necessarily seem to indicate surgical exploration.

EXPOSURE

The correct degree of penetration is of the utmost importance in producing the ideal gall-bladder film. Individuals vary so greatly that no fixed exposure rule can be given; suffice it to say, that in a given case that

degree of penetration should be used which will just pass through the patient. In other words, use the "softest" possible ray that will penetrate to the film. For some patients a $2\frac{1}{2}$-inch spark gap might be sufficient, while for stouter individuals $3\frac{1}{2}$ to $4\frac{1}{2}$ inches may be necessary. It should always be borne in mind that we are dealing with very slight variations in density, so that the slightest degree of over-penetration may obliterate many of these faint shadows.

The length of exposure requires attention as well as the degree of penetration. The exposure time should not be unduly prolonged—a second and a half at the longest. Too prolonged an exposure gives opportunity for motion on the part of the patient. Movement caused by respiration, muscle tremor, or even arterial pulsation might be enough to obliterate the shadows of gall-stones or of the gall-bladder.

HOLDING OF THE BREATH

An important factor, therefore, in exposing the plate is the correct holding of the patient's breath. While this would seem to be a simple matter, yet it is one of the most difficult things in which to instruct patients and have them carry out accurately. A plate or film perfectly exposed as to time and penetration, becomes valueless if there is the slightest motion on the part of the patient. We take a good deal of time in explaining to patients how to hold their breath. We do not attempt to have them hold it after a deep inspiration, for we have found that they are gradually expelling the air during the exposure. We, therefore, instruct them to stop breathing the instant we give the signal, attempting neither to inspire nor expire. This, for the moment, gives them no desire to inhale or exhale, and during that brief interval the exposure is made. We cannot emphasize too strongly the importance of a correct holding of the breath, for we have observed that a large number of our failures in diagnosis have been due to motion at the time of exposure.

Number of Plates or Films

One should not limit oneself to any fixed number of plates or films. Each patient is a rule unto himself. Repeated films must be made until a satisfactory degree of detail is obtained. For some patients two or three exposures may be sufficient, others may require ten, a dozen, or even more.

Our routine is to make one exposure, estimating the time and penetration best suited for the type of patient. This film is then developed under the personal supervision of the operator, who determines whether a change should be made in the next exposure to produce a more satisfactory film. In fact, each film is developed and examined before the next one is taken. We have found it a waste of time and energy to take four or five films at a time and have them all developed at once. This process of alternately exposing and developing is continued until the operator is confident that the best detail possible for that particular patient has been obtained.

A satisfactory gall-bladder film should show at least the twelfth and eleventh ribs and the lower dorsal and upper lumbar vertebræ (Plate XIV, Fig. 43). On account of the lack of penetration, spine detail is usually not obtained. The transverse processes, however, should be clearly seen. The lower edge and the lower portion of the outer edge of the liver should be visible. A portion of the right kidney should also be seen on a satisfactory film. The kidney shadow will be somewhat enlarged from distortion, since the exposure is made with the film on the anterior abdominal wall. Occasionally, however, the kidney shadow is not seen on the film. This may be due to the fact of its occupying an unusually low position or from some unknown cause. When the kidney shadow is visible, it simplifies the interpretation of the film. When the source of a suspicious shadow on the film is being considered, the kidney being definitely identified is thus eliminated as a possible cause.

Opaque Meal

Finally, after obtaining a sufficient number of gall-bladder films, the patient is given a barium meal. Films or possibly the fluoroscopic examination after such a meal may reveal any of the secondary or indirect evidence pointing to gall-bladder disease. The meal consists of 500 c.c. of buttermilk to which has been added 80 gm. of the specially prepared barium sulphate. Any other of the accepted media could be used. We have used buttermilk for the past ten years; all our observations have been made with this meal, and as yet we have found no reason to make a change.

INTERPRETATION

INTERPRETATION OF THE FILMS

HAVING obtained films as near technically perfect as possible, the next problem is to interpret the evidence which these films present. While there is great room for improvement in our technique, there is still greater opportunity for perfecting our interpretations. There is more in the films today than we can read. Only by continuous study of the x-ray evidence and checking up after operation or autopsy can progress be made.

It must be borne in mind that today the roentgenologist is not interested simply in the demonstration of gall-stones, but in the broader field of gall-bladder disease. We, therefore, study the films for other evidences of gall-bladder disease, besides the mere visualization of stones.

DIRECT EVIDENCE

For our convenience in teaching, we have divided the x-ray evidence of a pathological gall-bladder into two general groups: *direct* and *indirect*. Under *direct evidence* let us consider, first, the *demonstration of gall-stones*. Stones will show on the plate if there is sufficient *difference* in density between the stone or group of stones and the surrounding tissue. *It is only this difference in density which the x-ray detects and nothing more.* In general, the more lime salts a stone contains, the greater its density and the more easily demonstrated. Unfortunately, the ordinary stone contains only a small amount of calcium, the bulk of the stone being composed of cholesterin and bile pigment. We roughly classify gall-stones according to their x-ray appearance.

Visible Gall-Stones. The majority of gall-stones visualized on the x-ray film present the so-called peripheral shadow (Plate III, Fig. 9). The stone appears as a ring. This appearance may be explained by the fact

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that the periphery contains more lime than the central portion; on the other hand, any more or less translucent spherical body when viewed by transmitted light will present this "ring" appearance.

Laminated stones may be found (Plate X, Figs. 30 and 31). Their shadows are similar to the cross section of a tree-trunk where the growth rings are visible. This peculiar picture is undoubtedly due to different layers of salts being gradually deposited on the surface of the stone from time to time, some of the layers containing more calcium than others.

Dense homogeneous shadows are occasionally seen (Plate V, Fig. 15). This type of shadow represents a stone containing much calcium evenly distributed throughout. Such a stone may resemble a kidney stone and therefore requires more care in the differential study.

Fairly dense shadows may be found which suggest a mass of small stones or a collection of "sand," rather than one large solitary stone. Inspissated bile may at times be dense enough to cast a shadow on the plate (Plate VIII, Fig. 23).

Experimentally, the so-called "negative" stones may be demonstrated. These stones are of less density than the surrounding tissue and appear on the film as dark areas (being more easily penetrated by the x-ray). While theoretically such stones can be demonstrated in a patient, practically it is a rare occurrence. Such shadows, when seen, must be differentiated from small collections of gas in the stomach or intestine.

Stones may vary in number from one up to hundreds. Some of the single stones may grow to a large size. The whole gall-bladder may be filled with one large stone. Some of these large stones measure 3 inches or so in the longest diameter. All gradations in size are found, down to collections of minute specks, which are commonly called "sand."

We do not find the great variety in the shape of gall-stones that is seen in kidney stones. In general, gall-stones are not extremely irregular, being

usually rounded. When several stones are present, they become faceted and produce a polygonal shadow, frequently triangular (Plate VIII, Fig. 26).

CLASSIFICATION

With the permission of the author, we have adapted the classification of gall-stones as devised by Dr. Dudley Roberts. This classification we consider one of the most practical up to the present time; at least from an x-ray viewpoint.

1. *The Radial Cholesterin Stone.* This rare type of single stone occurs in gall-bladders which show evidence of dilatation without inflammation. Its structure is peculiar, in that it is composed of pure cholesterin crystals that radiate from the center to the surface. This stone is less dense than all surrounding tissue, and can be visualized only as a negative shadow, that is, a round or oval dark spot.

2. *The Combination Stone.* When inflammation develops in a gall-bladder which contains a radial cholesterin stone, the inflammatory exudate causes a deposit of lime salts on the stone, and this layer shows as a ring or oval shadow. It sometimes happens that the lime is unequally deposited and only a segment is visualized.

3. *Cholesterin-Bilirubin Calcium Stones.* This rather common type is fairly large, from two to five in number, frequently faceted and nested in the neck of the gall-bladder or the cystic duct. They are usually not layered, and the calcium salts are equally distributed through the mass of the stones so that they do not show as rings or triangles but as solid spots or as an elongated finger-like dense area due to the nesting of the stones. The percentage of lime is very small, and the shadows are lost by the slightest movement or over-penetration or darkening of "body rays."

4. *Common Multiple Faceted Stones.* As this group represents nearly half of all stones, familiarity with their size, structure and roentgenographic characteristics is most important. Their number is usually great, seldom less than twenty, frequently several hundreds. They are usually small, faceted, and very irregular in shape. They are composed of cholesterin and bile salts with very little intermixed

lime, but with a thin coating on some facets of some of the stones in a considerable percentage of collections. The visualization of some of these stones is exceedingly easy because of the dense lime coating which gives rise to an irregular mosaic. The greatest detail is necessary to visualize the majority, and one must learn to recognize the faint mosaic of the gall-bladder filled with such stones. This mosaic or spotted appearance is due either to the slight coating of stones with lime salts or to negative shadows made by the readily penetrated stones outlined by the denser bile. When the gall-bladder is crowded with relatively soft stones, the mass is sometimes suffi-cient to cast a definite shadow of a gall-bladder in which no individual shadows can be seen. These negative shadows are hard to interpret as stones because their outline is diffuse. No matter how great the detail is which we are ultimately able to obtain in this work, fully 15 per cent of stone diagnoses must be made by recognition of this persistent spotty appearance made by those soft stones in the fluid gall-bladder contents. At present it is impossible to secure evidence of this type of stones in heavy subjects, and allowance must always be made for this fact in making negative diagnoses.

5. *Pure Bilirubin Lime Stones.* These occur either as small seed-sized, soft black granules, or as several larger stones. While they are extremely soft and friable, they contain a definite admixture of lime, and only their small size makes their recognition difficult.

6. *Calcium Bilirubinate Stone.* This stone is usually single and of flinty hard-ness throughout, and consequently it gives rise to solid, unmistakable shadows. It unfortunately represents only about 5 per cent of all gall-stones.

DIFFERENTIAL DIAGNOSIS

In the differential diagnosis of gall-stones, the *shadows of calcified costal cartilages* require consideration. Cases where the entire cartilage is calcified offer no particular difficulty; but in some cases the cartilage is only partly calcified and there may be some discrete areas of lime salts deposited which strongly resemble gall-stones. Usually the irregularity of

their outline is sufficient to rule out gall-stones. Careful observation will show these shadows to lie in the region of the cartilage, and films made of the corresponding area on the left side will usually show a similar shadow. If there is still doubt, two films should be made with the central ray coming from a different direction. Owing to the fact that the costal cartilages lie just beneath the skin and practically on the films, the relation of the shadow to the end of the ribs will not vary with the change in the position of the tube. A gall-stone shadow, however, owing to its location at some distance from the plate, will vary considerably as the tube varies its position.

Renal calculi may produce shadows likely to be confused with gall-stones. In general, kidney stones are denser and more irregular in outline than gall-stones. A kidney stone, of course, will always be situated within the kidney shadow, no matter in what position the plate is made. We have found that the *lateral view* gives us reliable differential evidence. In a true lateral view of the abdomen, kidney stones will be seen lying on the level of or posterior to the anterior edge of the bodies of the vertebræ (Plate XLIV, Fig. 131). Gall-stones, on the other hand, if situated in the gall-bladder will always be anterior to the spine and fairly close to the anterior abdominal wall. Gall-stones in the ducts will, of course, be nearer the back, but even these should be anterior to the bodies of the vertebræ.

If there still is doubt, an injection of the kidney pelvis and ureter with some opaque solution will usually decide whether a certain shadow is within the kidney or not.

Occasionally a calcified tubercular lymphatic gland, and rarely some calcification in the adrenal gland, may give a confusing shadow. The irregularity of their outline will tend to rule out the possibility of gall-stones. Furthermore, we can usually demonstrate that these gland shadows are situated too far posteriorly for gall-stones. Glands in the mesentery can be diagnosed from the fact that they are freely movable.

Finally, *small collections of gas* in the hepatic flexure or in the duodenum may produce shadows simulating the so-called "negative stones." If a shadow under suspicion is caused by gas, its center will be much darker than the shadow of the surrounding soft tissue; whereas, if it is produced by a stone, the center of the shadow will be about the same density as the surrounding soft tissue. Shadows produced by gas are, of course, only temporary; they may change in size and position from minute to minute, or even disappear entirely. This, of course, is the most important differential point.

Fecal material in the bowel may be a cause for error in the interpretation of gall-stone shadows. A careful preliminary preparation of the patient will usually obviate this confusion, or the examination of the patient on another day will show the shadows of fecal material to be inconstant. A study of the barium-filled hepatic flexure will usually remove any remaining uncertainty.

Unusual calcified areas in diseased kidney or liver may cast shadows simulating stones. Such conditions are so rare that for practical purposes they need not be considered in a differential diagnosis.

In the same category may be considered foreign bodies in the gastro-intestinal tract. Theoretically, certain types of foreign bodies (such as buttons) may cast a shadow resembling gall-stones. And not uncommonly certain conditions in the skin of the patient may produce unusual shadows on the film. Small papillomata when actually in contact with the cassette may produce a shadow suggesting a gall-stone shadow. Simple moles may also produce the same appearance.

The Visible Pathological Gall-Bladder

Under the general heading of direct evidence we not only have the demonstration of actual gall-stones, but also the visualization of the gall-

bladder itself. This demonstration of the outline of the actual gall-bladder first attracted our attention in cases where gall-stones were clearly outlined. Careful observation of these cases frequently revealed a faint globular shadow surrounding the stone shadows. Then later, as we studied the so-called "suspicious" shadows, we frequently found that these indefinite, but abnormal, densities in the right upper quadrant resolved themselves into shadows having the size, shape, and position of gall-bladders. Finally, in operated cases where large hydrops conditions had been found, we ascertained on reexamining the plates that the outline of the enlarged bladder was clearly seen, its shadow, because of its size, having been mistaken for the kidney.

Therefore, it gradually dawned upon us that under certain conditions the gall-bladder itself was visible. We then began to look for the gall-bladder shadow in all cases. We soon observed that in cases coming to operation where the gall-bladder had been outlined on the film, some sort of pathology was invariably found in the gall-bladder. Our operative results finally forced upon us the conclusion that with the present technique a gall-bladder might produce a shadow on the x-ray plate or film if some change from the normal had altered its density. For instance, if it was considerably distended, its walls thickened, or its contents consisted of stones or abnormal bile, there was a very good chance that its outline would be seen on the x-ray plate. The converse of this proposition we have come to use as a working hypothesis. Perhaps it has no scientific proof, but the practical working out of the rule has demonstrated, to our satisfaction, its reliability: namely, if the shadow of the gall-bladder is seen in the x-ray film, it indicates that the gall-bladder is pathological.

Our operative results, covering the last few years, have shown us that this hypothesis is a safe guide. While it does not represent a scientifically proved statement of fact, yet for practical purposes we consider it a safe rule. Doubtless the time will come when, with improved technique, one will

be enabled to visualize the normal gall-bladder. With the present-day methods, however, such a demonstration seems unlikely.

Some investigators have felt that the normal gall-bladder shadow is occasionally visualized. They have based this observation in some cases on the fact that the gall-bladder shadow was seen on the plate, yet at operation the surgeon reported the gall-bladder to be normal. We are convinced, and in this many of our local surgical friends concur, that one cannot tell by looking at a gall-bladder or feeling it whether or not it is normal. Therefore, one should hesitate before asserting that a certain shadow represents a normal gall-bladder, unless the surgeon has removed the gall-bladder and had it examined by a competent pathologist.

Incidentally, in addition to the ordinary pathological evidence of a diseased gall-bladder, we have always considered that any change in the color or consistency of the bile is also evidence of gall-bladder disease. In this opinion we are definitely supported.

Again, we have had films and plates shown us as representing normal gall-bladders, in which the shadows interpreted as those of gall-bladders were clearly not of gall-bladders, but either of kidneys or of one of the various conditions discussed under differential diagnosis. One must be extremely careful before asserting that a certain shadow in the right upper quadrant actually represents the gall-bladder.

Finally, we frequently see films from which a diagnosis of pathological gall-bladder has been made which were technically so poor that the lower edge of the liver could not be identified. Opinions that a gall-bladder is normal, based on technically poor plates, should not be seriously considered.

Position of the Gall-Bladder Shadow

The gall-bladder shadow is usually observed in the right upper quadrant, in close proximity to and just below the lower edge of the liver. Oc-

casionally a gall-bladder shadow may be in such relation to the lower surface of the liver that its shadow appears to show through the liver substance. In stout individuals it frequently lies in the outer half of the right upper quadrant: in thinner patients, it lies nearer the median line, occasionally partly overlying the spine.

The level of the gall-bladder will, of course, vary with the position of the lower edge of the liver. Here again, in well-nourished individuals, its shadow will be seen high up on the right side; in thin people or patients with general ptosis, it may be seen well down in the right flank, and occasionally below the crest of the ilium.

Shape and Size of the Gall-Bladder Shadow

The ordinary gall-bladder as seen in the x-ray plate or film is oval in shape, the long diameter being vertical or inclining toward the median line in thin individuals. Frequently, in the well-nourished, its long diameter may be nearly horizontal. The lower pole or lower edge of the gall-bladder is usually the more clearly seen, the upper pole being obscured by the density of the liver tissue.

The gall-bladder shadow presents a marked variation in size in different individuals. We have observed chronic gall-bladders, which are contracted about a single stone, practically containing no bile and with thickened walls, the whole mass being no larger than an English walnut. On the other hand, with complete obstruction of the cystic duct, the lower pole of the bladder may reach the brim of the pelvis, the whole sausage-shaped mass measuring over 8 inches in length (Plate XXII, Fig. 1).

Differential Diagnosis

There are several conditions likely to be mistaken for the gall-bladder shadow. Perhaps the most confusing is the kidney shadow. It is a good rule

to hesitate before interpreting a shadow in the right upper quadrant as a gall-bladder unless the outline of the kidney is also clearly visualized. There is opportunity for error in reporting a gall-bladder without a visible kidney, for the chances are that the shadow seen is the kidney rather than the gall-bladder.

One helpful point is the distinctness with which the inner edge of the gall-bladder is usually seen in contradistinction to the inner edge of the kidney. The anatomical structure of the kidney is such, with the pelvis on the inner side, that this margin is not clearly seen. At times the kidney may be displaced or rotated so that the pelvis is more or less posterior. Its shadow under these circumstances is very confusing, as the inner edge of the kidney then resembles the edge of a somewhat enlarged gall-bladder.

If the kidney outline is not clearly seen in the front view, the patient may be turned on his back and a routine "kidney plate" made. This will frequently give the size and position of the kidney and enable one to differentiate it from the gall-bladder.

An unusual contour of the liver edge may occasionally be confused with a gall-bladder shadow. This, however, is not likely to be a common abnormality and in practice rarely has to be considered in the differential diagnosis. The so-called Riedel's lobe may simulate very closely a gall-bladder shadow. The differential point is: If we are dealing with a Riedel's lobe, its outline is continuous with, and of the same density as, the liver edge. The shadow produced by the gall-bladder, however, usually appears distinct from the liver edge and of different density from the liver tissue.

It is interesting to note that some authors consider the presence of a Riedel's lobe as evidence of pathology in the biliary system.

Stomach and intestinal contents may occasionally be of such a nature as to cast a shadow on the film. If these shadows happen to be in the right upper quadrant, they may be confused with a possible gall-bladder shadow.

This is particularly true of a "food-filled" duodenum, the duodenal cap frequently having more or less the shape of a gall-bladder, and with a similar smooth margin. Food is, of course, continually passing through the duodenum, so that a food shadow will be *inconstant*. This is the important differential point. If at the end of an examination, there is still doubt as to whether a certain shadow is the gall-bladder or food in the duodenum, the patient may be asked to return on another day, taking the precautionary measure of an empty stomach.

Fecal material in the hepatic flexure may also be confusing when one is looking for a gall-bladder shadow. This may be ruled out in the same general way as a food-filled duodenum. In addition, a study of the twenty-four-hour filled film will definitely identify the hepatic flexure, this portion of the colon being filled with barium at that time. If the shadow suggesting the gall-bladder is still seen, one would be warranted in considering it positively a gall-bladder shadow.

Certain tumor masses in rare cases may produce shadows in the right upper quadrant likely to be confused with pathological gall-bladders. Cancer of the head of the pancreas or of the pyloric end of the stomach is the most common. The differential diagnosis depends on the lack of a discrete margin to a shadow produced by a growth of the pancreas or stomach, the margin of the shadow of an enlarged gall-bladder being usually sharp and clean cut. Furthermore, in cases of malignant tumors of sufficient size to cast a shadow on the plate, there will be enough indirect evidence to make the diagnosis clear. The character of the deformity of the stomach and duodenum due to cancer in the right upper quadrant is almost pathognomonic.

In rare cases it may be of help in a differential diagnosis to examine a patient after a pneumoperitoneum. We have not used this method to any extent in our own practice.

Indirect Evidence

The direct evidence of gall-bladder disease is obtained from plates and films made directly of the gall-bladder region. The evidence consists, in general, as we have seen, of a demonstration of gall-stones or of the pathological gall-bladder. The indirect evidence of gall-bladder disease is obtained by a study of the various organs surrounding the gall-bladder. These organs, of course, are not visible without a barium meal. The search for indirect evidence is, therefore, always made after a barium meal.

Deformities Due to Pressure

The most common type of indirect evidence is the deformity of the duodenum or stomach due to pressure from the gall-bladder (Plate XXVIII, Fig. 8⁻; Plate XXXII, Fig. 98; Plate XXXIII, Figs. 100 and 101). This pressure deformity has a characteristic appearance, which is best understood by a study of the films or plates. The value of this type of evidence lies in the fact that in our experience this deformity is never produced by a normal gall-bladder. This may be explained by the theory that the tension within the normal gall-bladder is less than the tension within the food-filled duodenum or stomach. In other words, the normal gall-bladder is more easily compressed than the stomach. Hence the stomach or duodenum when brought into contact with the normal gall-bladder will compress the gall-bladder, rather than be deformed itself by the gall-bladder.

When pathological changes take place in the gall-bladder—thickening of the walls, increased fluid, or stones—then the pressure within the gall-bladder may become greater than the pressure within the stomach. Under these circumstances, the stomach or duodenum will be compressed by the gall-bladder and the typical "pressure defect" produced. The deformity is usually seen in the first or second portion of the duodenum, but it may involve the greater curvature of the stomach, near the pylorus (Plate

XXXIII, Figs. 100 and 101). The deformity is in the nature of an indentation on the viscus, the indentation apparently being produced by some smooth, rounded object. There is usually no irregularity in the outline of the duodenum or stomach in the area involved, the margin being smooth and the indentation in the form of a concave curve. The arc of the curve is more or less constant, representing that portion of the gall-bladder that is in contact with the duodenum or stomach.

When involving the duodenum, the deformity is usually on its outer edge. In a centrally situated gall-bladder, the inner edge of the duodenum may be involved.

Occasionally the superior angle may be flattened by the gall-bladder. Such a situation produces a more or less rectangular shape of the duodenum, and in marked cases produces a much "flattened" cap, the vertical diameter being greatly narrowed. This particular deformity of the cap is seen most frequently in the lateral position. As we have just stated, the margin of this deformity is usually smooth. In rare cases, however, it will have a somewhat "scalloped" appearance (Plate XXXIII, Fig. 102) due to pressure of some actual stones within the gall-bladder.

The second portion of the duodenum will at times show the effect of gall-bladder pressure (Plate XXXIX, Fig. 116). The pressure deformity shows the same characteristic type of curve as seen in the first portion. The deformity of this part of the duodenum is usually associated with fixation due to adhesions, which will be discussed later.

When involving the stomach, the pressure deformity is in the antrum on the greater curvature (Plate XXXVI, Figs. 109 and 110). Here again the curve has the same characteristic arc. This deformity is seen best with the patient in the prone position, when, particularly in stout individuals, the antrum is forced into the right upper quadrant, thus coming into contact with the gall-bladder. Usually in the upright position, the stomach falls away from

the right upper quadrant and the pressure defect of the gall-bladder becomes obliterated. Occasionally, however, the antrum of the stomach may be fixed by adhesions in the right upper quadrant, so that even in the upright position the gall-bladder pressure will still be seen.

In the interpretation of these curved pressure defects, one should bear in mind that while an enlarged gall-bladder is almost always the cause of the deformity, still there are rare exceptions that should be borne in mind. An abnormal contour of the under surface of the liver might produce a similar deformity; likewise, an enlarged or freely movable kidney. Various rare forms of new growth, particularly of the cystic type, or where the tumor mass has a rounded and smooth surface, might cause pressure similar to an enlarged gall-bladder. In this last class are the cystic conditions of the head of the pancreas.

Secondary Changes Due to Adhesions

We now come to the consideration of other changes in adjacent organs (aside from those caused by pressure) that are secondary to gall-bladder disease. Practically all these changes may be classified under the general heading of adhesions. We shall be considering, therefore, the various manifestations of the results of gall-bladder adhesions on other organs.

First Portion of the Duodenum. The organ most frequently affected by gall-bladder adhesions is the first portion of the duodenum. The character of the changes produced in the first portion by adhesions group themselves into more or less definite types of filling defect. Perhaps the most common—and one must be familiar with the surgical picture to appreciate this type of filling defect— is as if strings were pulled backward and forward over the anterior surface and pulled down upon the first portion, giving a more or less toothed appearance (Plate XXXV, Fig. 107). One simple and not very reliable differentiation between this condition and ulcer is that adhesions play their

most deforming rôle at the time when the stomach is full rather than when it is partially empty. In general, the ulcer picture is not so characteristic immediately after the injection of a meal as a little while later in the examination. The ulcer-filling defect becomes more definite up to a certain point in the emptying of the stomach, while the deforming defects from gall-bladder adhesions gradually disappear as the stomach empties and relaxes.

The second type of deformity from adhesions involving the first portion of the duodenum is the complete obliteration of the normal outline of the duodenum, the lumen becoming tubular in character, as though gripped by a firm band of adhesions a centimeter or more in width. This condition, too, may be confused with the chronic indurated obliterative type of ulcer (Plate XXXIV, Fig. 105).

The third type of filling defect commonly met with is a combination of the ulcer picture and of adhesions, and it becomes difficult to determine by any means except surgery whether the deforming defect found in the duodenum is due primarily to ulcer or to adhesions, or to both.

Second Portion of the Duodenum. The second portion of the duodenum is frequently the site of changes due to gall-bladder disease. In addition to the deformities due to pressure already spoken of, we have changes in the position and outline due to adhesions. The frequency with which this second portion is disturbed by gall-bladder disease is contrary to one's expectations, for this portion is usually considered to be more or less retroperitoneal.

The most common deformity is an apparent picking up of the descending or second portion of the duodenum, displacing it and fixing it toward the right (Plate XXXIX, Figs. 116 and 117). This lateral displacement frequently produces an appearance on the film or plate as though the fundus of the gall-bladder were outlined by the duodenum. This deformity is the result of pressure plus an adhesion fixation.

Occasionally one finds a simple narrowing at one point of the duodenum.

This type of deformity is usually due to one single band of adhesions lying across the duodenum (Plate XL, Fig. 120).

Jejunum. Another opportunity to observe secondary manifestations of gall-bladder disease may be found in the study of the *jejunum*. Occasionally one finds, in the right upper quadrant, loops of jejunum filled with gas, showing on the films previous to the ingestion of the barium meal. If this phenomenon is confirmed when the jejunum is filled with barium, it becomes an important diagnostic point (Plate XXXIV, Fig. 105 and Plate XLII, Fig. 125).

Barring the rare possibility of a congenital malposition of the small intestine or a chronic tubercular peritonitis, one must conclude that these loops of jejunum are displaced and fixed by adhesions from the pathological gall-bladder.

Colon. An important organ to examine for changes due to gall-bladder disease is the colon in the region of the hepatic flexure. The most characteristic changes in the hepatic flexure are a catching up and "pulling out" of a small portion of the wall of the colon. The resulting deformity has the appearance of a sacculation in which there is usually a collection of gas, the main lumen of the colon being filled with the barium meal (Plate XXIV, Fig. 77). This projection or sacculation is, of course, due to an adhesion from the gall-bladder, and therefore is always located close to the gall-bladder. This particular type of deformity is almost pathognomonic of gall-bladder disease.

There may be a general deformity of the hepatic flexure due to more extensive gall-bladder adhesions. From the fact that these general adhesions are in the right upper quadrant, we are usually safe in considering them as coming from the gall-bladder. However, one must bear in mind that there may be other sources for these adhesions—a long retrocecal appendix, omental adhesions, or tubercular peritonitis. There is, however, a more or less characteristic deformity of the hepatic flexure and proximal portion of the

transverse colon, frequently seen as a result of gall-bladder disease. This deformity consists of a "picking up" and fixing of the transverse colon at a point a few inches distal from the hepatic flexure (Plate XLII, Fig. 127). This produces a more or less sharp angulation of the transverse colon, and we have come to speak of it as a "pseudohepatic flexure."

Finally, we have the simple displacement of the hepatic flexure from an enlarged gall-bladder. This displacement is usually downward and toward the median line (Plate XXII, Fig. 71).

Kidney. In the differential diagnosis it is rarely necessary to consider a displacement due to an enlarged or low kidney. Fortunately, the kidney does not usually displace the hepatic flexure. When it does, however, the colon usually goes downward and to the outer side.

FIXATION OF ORGANS

Quite commonly one will observe no deformity in the outline of the various organs which could be ascribed to adhesions, but there will be a fixation of the part. The organ may be "fixed" in its normal position or displaced and fixed, the fixed portion always being close to the gall-bladder. For instance, the pyloric end of the stomach may be found far over to the right side and fixed. A similar situation may involve the hepatic flexure. This fixation may be demonstrated by palpation under the fluoroscopic screen, or by taking films with the patient prone and standing. In the latter method, the "fixed" portion will have a constant relation to the gall-bladder in both positions.

SPASTIC CHANGES IN THE STOMACH

The pathological gall-bladder, like the chronic appendix, may produce reflexly various spastic manifestations in the stomach. These spastic changes in general do not differ from reflex spasms due to other causes. There is, however, one type of spasm that in our experience is so commonly associated

with gall-bladder disease that we have come to consider it when present as fairly reliable evidence. This type of spasm affects the antrum of the stomach. Usually the distal third of the stomach becomes uniformly contracted, producing a tubular outline an inch or so in diameter, the proximal two-thirds maintaining its normal diameter (Plate XLIII, Fig. 129).

Changes in the Gall-Ducts

Finally, the changes observed in the gall-ducts are very important indirect evidences. We have noticed from time to time a small speck of barium retained close to the second portion of the duodenum but not within its lumen (Plate XLI, Fig. 123). The small shadow could frequently be seen twenty-four hours after the barium meal. At first we considered this to be a small congenital diverticulum attached to the second portion of the duodenum; but repeated occurrences of this condition, with the shadow always bearing a constant relation to the duodenum, have led us to conclude that we are dealing with barium in the ampulla of Vater. We believe that under certain conditions the ampulla becomes dilated or relaxed so as to allow the entrance of barium into it. This dilatation might be the after-effect of the passage of a large gall-stone or some chronic inflammatory condition. Possibly some interference with the normal flow of bile or pancreatic secretion may allow this phenomenon to take place.

We consider the barium-filled ampulla to be practically pathognomonic of some form of gall-bladder or pancreas disease. This consideration is based on the fact that in every case coming to operation where this phenomenon was observed, a pathological condition was found either in the gall-bladder, in the ducts, or in the pancreas. Again, we have never been able to demonstrate a barium-filled ampulla of Vater in a normal individual, either after an exhaustive film examination or with palpation under the fluoroscopic screen.

CONCLUSION

IN conclusion, let us remind the reader that the value of the x-ray in the diagnosis of gall-bladder disease depends, first, on careful attention to the details of technique. The methods for preparing the patient and for making the exposures are not complicated or involved. On the contrary, they are extremely simple, but frequently lack of attention to some apparently unimportant detail is what stands between success and failure.

Secondly, the diagnosis of gall-bladder disease is not limited to the demonstration of gall-stones. The diagnosis is made on a great mass of direct and indirect evidence. The degree of positiveness of the diagnosis depends on the amount of evidence. If gall-stones are visible, the diagnosis is positive. On the other hand, if the entire examination reveals only one minor type of indirect evidence, such as a suggestive pressure defect on the duodenum, then only a *presumptive* diagnosis can be made; or, as we frequently report, "the evidence is consistent with gall-bladder disease."

Finally, we have endeavored not to elaborate some scientifically proved method of diagnosis, but rather to report our progress toward the ultimate solution of one of the most difficult problems before the medical profession. If this modest work should by chance stimulate some one to "carry on" in this pioneer field of roentgenology, we shall rest content.

STATISTICS

The writers realize the inaccuracy of statistics as well as anyone. The following figures are offered, however, as something of a guide. They represent a summary of a series of cases which were referred to us and on which we reported in turn to the consultant, from January 1, 1920 to November 1, 1920, making a total of ten months. During this time we find, on going over our records, that we passed an opinion in 746 cases either on the positive or negative aspect of the gall-bladder examination. In some instances we

knew the cases were referred for distinctly definite lesions of the stomach, the physician expecting from the clinical evidence to find ulcer or cancer. Nevertheless, in these cases, in an effort to base our knowledge of gall-bladder disease upon the surgical findings from as great a number of cases as possible, we reported to the consultant any suggestive shadows that seemed abnormal in the gall-bladder. We hoped that the surgeon would at least casually investigate the gall-bladder and help us to determine more quickly the value of certain signs which seemed definite from a purely roentgenographic point of view.

In order not to include any personal equation in compiling these statistics, we gave all our reports and the letters received from the medical men and surgical consultants who replied to our request for the surgical findings, to a disinterested individual. She compiled them simply from a statistical point of view, using her judgment in interpreting the reports as to whether they were positive or negative. Out of a total of 746 cases reported on during this period of time, 128 were operated upon and reported to us as to the surgical findings. These cases are included in the statistics. Some medical men did not answer our letters. Undoubtedly, some cases have been operated upon, or will be, of which we have no knowledge.

Of the 128 operative cases, eight diagnoses were proved wrong on the negative aspect and seven on the positive, making the percentage of correct diagnoses 88.4 with a percentage of error of 11.6 per cent.

Reported between January 1, 1920 and November 1, 1920.

(Total of positive and negative opinions). 746 cases

Operative findings reported on............ . .. . 128 cases

Correct interpretation in x-ray examination............. 114 cases

Errors................. .... 15 cases

Percentage (correct) ... . 88.4 per cent.

Percentage (incorrect) ... . 11.6 per cent.

ROENTGEN PLATES OF
PATHOLOGICAL GALL-BLADDERS
THAT MAY OR MAY NOT
CONTAIN GALL-STONES

PATHOLOGICAL GALL-BLADDERS CONTAINING GALL-STONES

In the study of the individual case for the detection of gall-stones, the difficulty in demonstrating or making visible the gall-stones is partly a physical problem, but mostly lack of care in the essential details of the x-ray examination. Too much emphasis cannot be laid upon the necessity of immobilizing, not only the part to be taken, but the respiratory motions. The *slightest amount of breathing* in itself will make invisible even a fairly definite calcium stone (Plate X, Figs. 30 and 31). We feel that stones of reasonable size and density are usually visible eventually, with perseverance as to the number of films and extreme care in the amount of milliamperage and voltage used, and, most of all, with attention to the *immobilization of the part.*

Secondary in importance is the examination of the whole region in which the gall-stones may be found. One must not overlook any part of the right upper quadrant, sometimes going down to and below the crest of the ilium. One never knows where the stone may be found.

Errors may arise and have occurred in the writers' experience, through superficial skin defects, such as moles, warts, etc., through scars on the anterior abdominal wall and on the back, through calcified mesenteric glands, foreign bodies in the colon, calcification of the liver, calcification of the pancreas, irregular calcification of the costal cartilage, stones and calcified areas within the right kidney, and rarely through myositis ossificans of the deep muscles. In the type of stone that by its chemical make-up is not dense enough or of atomic weight sufficient to cast a shadow either of the periphery or of the nucleus, we are able at times to make visible the mass by its increased density. Occasionally, even in difficult types of stones, it is
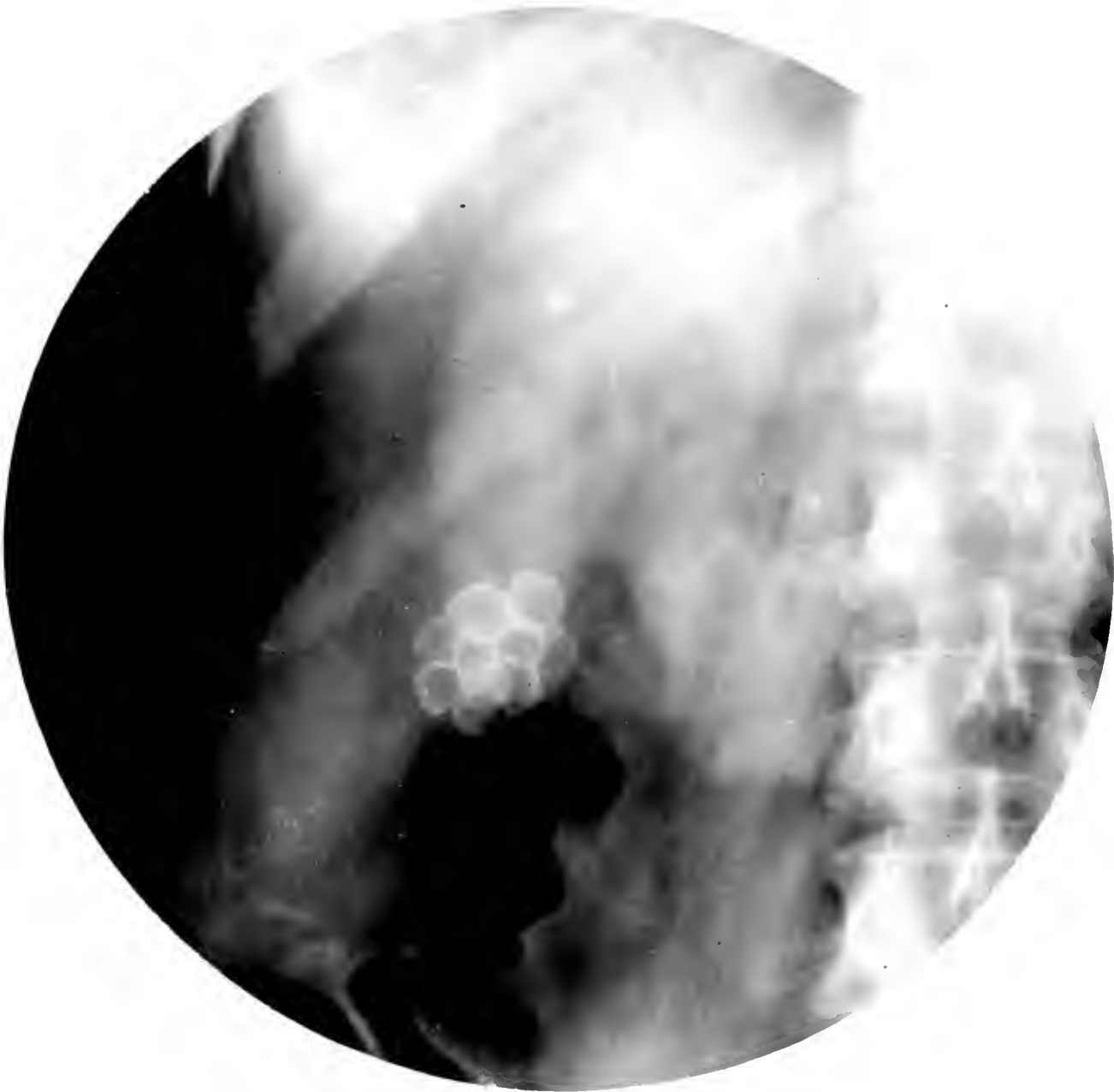
PLATE I

Visible gall-stones.   This examination was made with the Potter-Bucky diaphragm.

PLANCHE I

Calculs biliaires radiographiés avec l'antidiffuseur Potter-Bucky.

PLANCHA I

Cálculos visibles. El examen se hizo con el antidifusor Potter-Bucky.

possible to make one individual stone stand out even in a collection of a larger number of invisible stones.

The position of the patient on the plate and in relation to the tube (Figs. 1 and 2) is of the utmost importance, and an effort should be made to obtain a series of films of the right quality in the same position, rather than to change the position of the patient in relation to the tube. The latter will lead to uncertainty and error.

LES VÉSICULES BILIAIRES MALADES ET CALCU-LEUSES

Dans la recherche des calculs biliaires on se heurte, sans doute, à des difficultés d'ordre physique, mais la plupart des obstacles peuvent être surmontés avec une technique soignée. On ne saurait trop insister sur la nécessité d'immobiliser non seulement la région, mais aussi les viscères, en suspendant la respiration. *Le plus faible mouvement respiratoire peut effacer un calcul qui, sans cela, serait bien visible* (planche X, figs. 30 et 31). Nous nous croyons en droit d'affirmer que tout calcul de taille ou de consistance raisonnables peut se montrer si l'on ne se rebute pas, si l'on ne néglige pas les détails de la prise du cliché, et, surtout, *si l'on immobilise le sujet.*

On ne négligera pas, non plus, d'explorer toute la zone où peut se trouver une vésicule. Non seulement il faut balayer tout l'hypochondre droit, mais, parfois, descendre, jusqu'à la crête iliaque et même plus bas. On ne sait jamais où peut se blottir un calcul.

Une cause d'erreur possible, à notre connaissance, c'est la présence de verrues, loupes ou autres excroissances cutanées. Des cicatrices de la paroi abdominale ou dorsale, des ganglions mésentériques crétacés, des corps

étrangers du colon, des calcifications du foie ou du pancréas, des dépôts calcaires dans les cartilages costaux, des calculs ou des dépôts calcaires dans le rein droit, exceptionellement la myosite ossifiante, tout cela peut simuler le calcul biliaire. Quand les calculs pris individuellement n'ont pas une composition chimique permettant d'en obtenir une ombre, leur groupement peut constituer une masse assez dense pour leur permettre de se révéler sur le cliché. Parfois, même dans un amas de calculs peu visibles, un d'entre eux se montrera clairement.

La position du malade et de l'ampoule (figs. 1 et 2), est très importante. Mieux vaut obtenir une série de plaques de bonne qualité photographique sans rien déplacer, que de modifier sans cesse l'orientation du tube; cette dernière pratique engendre des hésitations et des erreurs.

INVESTIGACIÓN DE LOS CÁLCULOS BILIARES

No hay duda de que la investigación de los cálculos biliares, si no es metódica, tropieza con serias dificultades de orden físico, que, sin embargo, el empleo de una técnica cuidadosamente reglada podrá vencer el mayor número de veces. En ninguna otra ocasión son tan necesarias e imperiosas, como en esta, la inmovilidad de la región examinada y la suspensión absoluta de la respiración. *El mas breve movimiento respiratorio* puede, por si solo, velar y hacer, desde luego, invisibles hasta las imágenes de cálculos moderadamente ricos en calcium que, sin esta circunstancia, habrían aparecido nítidos en los roentgenogramas (Plancha X, Figs. 30 y 31). Nosotros creemos no incurrir en error al sostener que ordinariamente es posible obtener la imagen de cualginer cálculo de tamaño y consistencia medianos, con tal que se impresionen varias películas, se consuma elcorrecto número de miliamperios a un voltaje adecuado y *no se descuide*, ante todo, *la inmovilizacion del sujeto.*

Es asimismo importante extender la exploración a toda la zona en la cual puedan encontrarse cálculos biliares. No sólo debe de examinarse todo el hipocondrio derecho sino que, a veces, es necesario descender hasta, y aún por debajo, de la cresta ilíaca, puesto que nunca se sabe donde fijamente está el cálculo.

Nuestra experiencia nos ha advertido de varias causas de error posible, tales son: la presencia de verrugas lunares, angiomas y otras excrecencias cutáneas; las cicatrices en la pared abdominal y en la espalda; los ganglios mesentéricos cretáceos; los cuerpos extraños del colon; los depósitos calcáreos en el hígado y el páncreas; la calcificación irregular de los cartílagos costales; los cálculos y los depósitos calcáreos en el riñón derecho y, excepcionalmente, la miositis osificante de los músculos profundos.

Cuando la composición química de los diversos cálculos de un grupo, considerados aisladamente, es tal que ni su peso atómico ni su densidad le permiten proyectar una sombra, bien sea de la periferia, bien del núcleo, del cálculo, ocurre sin embargo, que su agrupamiento puede constituir una masa bastante densa para revelarse claramente en el clisé. A veces también sucede que en un paquete de cálculos poco visibles uno, entre todos, da una imagen netamente visible.

La posición del enfermo con relación a la placa fotográfica y a la ampolla radiógena (Figs. 1 y 2) de gran importancia. Valem as obtener una serie de películas de buena cualidad en la misma posición de sujeto y ampolla, que alterando las relaciones de uno y otra; esto último conduce a la incertidumbre y al error.

PLATE II

PLANCHE II

PLANCHA II

PLATE II

FIG. 3. Woman, aged thirty-five. A mass of stones in the gall-bladder and one in the cystic duct. Illustrates the type of dense gall-stones containing more calcium than the usual gall-stone, and, in the experience of the writers, the only instance in which the stones cast such a definite shadow as is found in this case. Also illustrates the location of the gall-bladder in thin and poorly nourished men or women, especially in women. By the relation of the gall-bladder, though the stomach is not illustrated, one can see how the pressure of these stones, even though they should prove to be a negative shadow, would cause deformity of either the stomach or duodenum, either by fixation of a portion of the stomach or of the gall-bladder, or by pressure against the stomach or the second portion of the duodenum. If all gall-stones were of the density of these stones, they would be as easily recognized by the x-ray as kidney stones. This is the unusual type of very dense gall-stones, rarely seen.

FIG. 4. A large number of gall-stones.

FIG. 5. The gall-bladder full of almost pure bilirubin lime stones.

PLANCHE II

FIG. 3. Femme de 35 ans. Un amas de calculs dans la vésicule, un autre dans le canal cystique. Nous avons ici des calculs exceptionnellement riches en calcium, portant les ombres les plus nettes que les auteurs aient rencontrées. Le cliché montre aussi la situation ordinaire de la vésicule chez des sujets maigres ou dénourris, généralement du sexe féminin. Par la seule position de la vésicule, bien que l'estomac ne soit pas visible, on se rend compte des tiraillements et des compressions que la vésicule biliaire peut exercer sur l'estomac ou sur la seconde partie du duodénum. Si tous les calculs biliaires avaient la densité de ceux figurés ici, on les décèlerait aussi facilement que des calculs rénaux. On en rencontre rarement d'aussi opaques.

FIG. 4. Nombreux calculs biliaires.

FIG. 5. La vésicule remplie de calculs à base de bilirubinate de chaux presque pur.

PLANCHA II

FIG. 3. Mujer de 35 años; Grupo de cálculos en la vesícula y uno en el conducto cístico. Pertenece a una variedad excesivamente rica en calcio, y es el único ejemplar en que los autores han podido obtener imágenes tan densas y precisas. El clisé muestra la situacion de la vesícula en sujetos flacos y mal nutridos, principalmente mujeres. Si bien no enseña la imagen del estómago, en cambio la posición anormal de la vesícula da buena idea de cómo la presión ejercida por dichos cálculos, aunque hubieran sido de los que originan sombras negativas, es causa importante y frecuente de deformaciones en las imágenes del estómago y del duodeno, ora fijando un segmento del estómago a la misma vesícula biliar o bien comprimiendo contra el estómago la segunda porción del duodeno. Si todos los cálculos biliares tuvieran la densidad de estos, su reconocimiento sería tan fácil como el de los renales; pero raras veces suelen ser tan opacos.

FIG. 4. Numerosos cálculos biliares.

FIG. 5. Vesícula biliar repleta de cálculos de bilirubinato de cal casi puro.
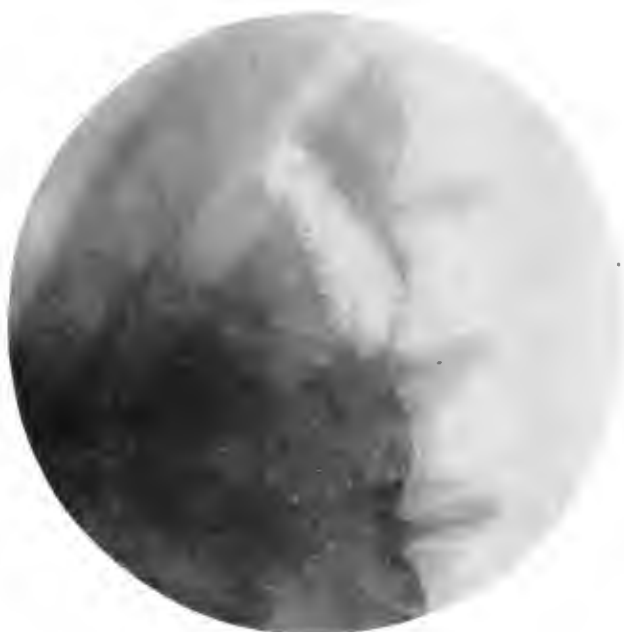
PLATE II

FIG. 3.

FIG. 4.

FIG. 5.

PLATE III

PLANCHE III

PLANCHA III

PLATE III

Fig. 6. Unusual arrangement of calcium shadows which suggest one single stone, possibly several stones. At operation, this proved to be one single stone.

Fig. 7. Same case as shown in Fig. 6. Barium-filled stomach showing the relation of the shadows to the stomach.

Fig. 8. X-ray of the gall-bladder region of a woman, showing several faint peripheral shadows due to gall-stones.

Fig. 9. Two gall-stones in a woman, aged sixty. Illustrates one type of the characteristic peripheral calcium stone. The nucleus has very little density, if any. Easily recognized in plates and characteristic of gall-stones rather than of mesenteric glands or renal stones. The difficulty in demonstrating this type of stone is mostly in the patient's breathing or moving; otherwise it can be demonstrated without difficulty on the plate or film.

PLANCHE III

Fig. 6. Ceci pouvait être dû à un seul calcul ou à un amas compact. A l'opération: un calcul.

Fig. 7. Rapport des ombres figurées plus haut avec l'estomac rempli de baryum.

Fig. 8. Radiographie de la région vésiculaire d'une femme, montrant plusieurs ombres annulaires très faibles, dues à des calculs bilaires.

Fig. 9. Deux calculs biliaires chez une femme de 60 ans. C'est là un des types du calcul à couches concentriques avec cortex riche en chaux. On les différencie aisément d'avec les ganglions mésentériques ou les calculs du rein. Si l'immobilisation du patient est assurée et la respiration suspendue, on doit pouvoir mettre de tels calculs en évidence.

PLANCHA III

Fig. 6. Imagen bizarra de un cálculo abundante en sales de calcio. Pudo ser producida también por un grupo compacto; pero la intervención quirúrgica demostró que no había mas que uno.

Fig. 7. El mismo caso de la figura 6. Muestra las relaciones de dicho cálculo con la silueta del estómago.

Fig. 8. Roentgenograma de la región biliar de una mujer presentando varias sombras anulares muy ténues débidas a cálculos biliares.

Fig. 9. Dos cálculos biliares en una mujer de 60 años. Son imágenes típicas, fácilmente reconocibles y características, de cálculos biliares con núcleo de escasa densidad y periferia rica en sales de calcio. Se las diferencia sin trabajo de los ganglios mesentéricos y de las piedras renales. Los principales obstáculos a su demostración roentgenográfica son la respiración y los movimientos del enfermo. Si ambas cosas se evitan, el resultado satisfactorio es frecuente.

PLATE III

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

PLATE IV

PLANCHE IV

PLANCHA IV

PLATE IV

Fig. 10.   Woman, aged fifty-five; weight, 261 pounds. Two definite stones found without difficulty. At operation, 2 stones were found the size shown in the film and several smaller ones that were not visible on the plate.

Fig. 11.   Collection of small gall-stones within a small gall-bladder. At the time of operation several surgeons were unable to palpitate these stones through the gall-bladder wall. Under ordinary circumstances the surgeon would not have considered gall-stones, illustrating that all gall-bladders must be opened to determine the presence or absence of gall-stones.

Fig. 12.   Gall-bladder just below the liver; small in size but rather dense in shadow-producing qualities, suggesting the probability of the pathological gall-bladder containing stones. Confirmed at operation.

PLANCHE IV

Fig. 10.   Femme de 55 ans pesant 119 kilos. Deux calculs facilement décelables. A l'opération on en trouva d'autres plus petits que la radio-graphie avait méconnus.

Fig. 11.   Amas de petits calculs dans une petite vésicule. A l'opération, plusieurs chirurgiens présents ne purent les sentir à travers les parois. Ils se seraient crus en droit de nier leur présence. Il faut donc ouvrir une vésicule si l'on veut être sûr de ce qu'elle contient.

Fig. 12.   La vésicule située immédiatement sous le foie. Une ombre aussi nette, en dépit de ses dimensions restreintes, fit dire que la vésicule devait être malade et contenir des calculs. Confirmation opératoire.

PLANCHA IV

Fig. 10.   Mujer de cincuenta y cinco años, que pesa 261 libras. Dos cálculos fácilmente reconocibles. La operación los encontró del mismo tamaño que habían aparecido en la película y además varios otros pequeños no sospechados.

Fig. 11.   Colección de pequeños cálculos dentro de una vesícula pequeña. Durante la operación varios cirujanos presentes no pudieron sentirlos a través de las paredes de la vegiguilla. En circunstancias iguales se comprende que pueda negarse su presencia. De ahí la necesidad de abrir siempre la vesícula para asegurarse si contiene o no cálculos.

Fig. 12.   Vesícula situada inmediatamente por debajo del hígado. A pesar de su exíguo tamaño, como la sombra roentgeniana era tan densa, pensamos que se trataba de una vesícula enferma y con cálculos. La operacion confirmó las sospechas.
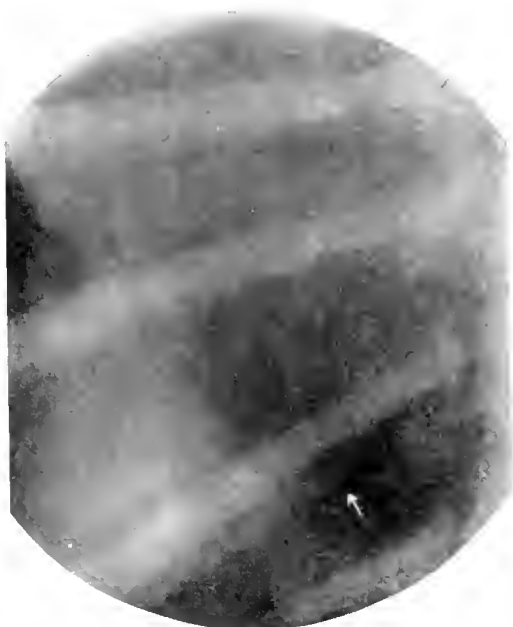
PLATE IV

FIG. 10.

FIG. 11.

FIG. 12.

PLATE V

PLANCHE V

PLANCHA V

PLATE V

Fig. 13. Illustrates the presence of gall-stones in a woman, aged twenty-three, and also illustrates, in the absence of visible stones, that the position of the stomach (plate made in the routine prone position) suggests always the possibility of fixation and pressure against the antrum (A), indicating the possibility of the gall-bladder being the cause of this deformity. Surgically proved to have 37 small stones.

Fig. 14. Group of gall-stones of uniform size and density. Note dense peripheral shadows with very little shadow in the nucleus of each stone.

Fig. 15. A well-nourished individual showing two of the common multiple-faceted stones. Easily recognized unless obscured by breathing. Stones of this type should always show on the plate or film.

Fig. 16. Collection of small stones of low atomic weight, the gall-bladder slightly pressing against the antrum of the stomach.

PLANCHE V

Fig. 13. Calculs chez une femme âgée de 23 ans. Le cliché démontre en plus que l'aspect de l'estomac radiographié dans le décubitus abdominal pourrait suggérer des calculs même si leur ombre était absente. Il est tiraillé et l'antre pylorique, "A," est déformé par une compression extérieure. A l'opération, 37 petits calculs.

Fig. 14. Un groupe de calculs biliaires de forme et de composition identiques. Noter que le centre est beaucoup plus transparent que la périphérie.

Fig. 15. Deux calculs d'un type très commun, dits calculs à facettes, radiographiés chez un patient assez corpulent. On les décèlera assez facilement si l'on a soin d'interdire tout mouvement, respiratoire ou autre.

Fig. 16. Un amas de petits calculs à poids atomique très faible. La vésicule déforme un peu l'antre pylorique sur lequel elle appuie.

PLANCHA V

Fig. 13. Cálculos biliares en una mujer de 23 años. El roentgenograma demuestra también que el aspecto y posición del estómago, con el sujeto en decúbito abdominal, podría, aún en la ausencia de imágenes calculares visibles, sugerir el diagnóstico de adherencias y deformación del antro pilórico (A) ocasionadas por colecistitis calculosa. La operación descubrió 37 pequeños cálculos.

Fig. 14. Grupo de cálculos biliares de tamaño y densidad uniformes. Nótese que el centro de cada cálculo es mucho mas transparente que la periferia.

Fig. 15. Dos ejemplares de una variedad de cálculos muy común, llamada en facetas, obtenidos en sujeto de complexión robusta. Su diagnóstico roentgenográfico es fácil, a condición de prohibir durante la exposición toda clase de movimiento.

Fig. 16. Colección de cálculos pequeños y de escaso peso atómico; la vesícula biliar comprime y deforma ligeramente el antro pilórico.
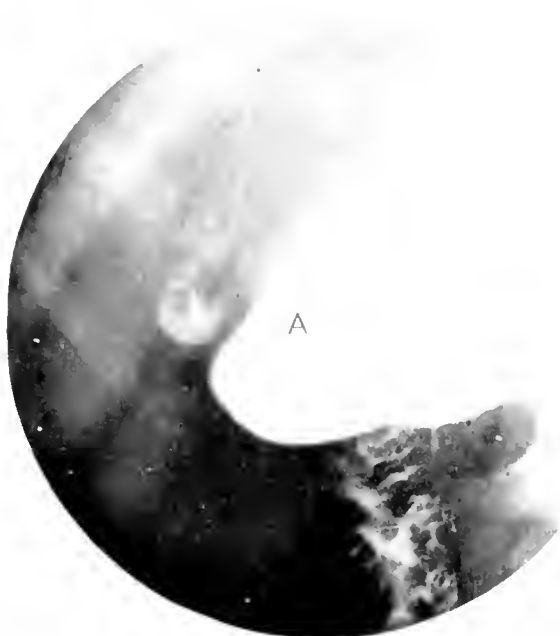
PLATE V

A

FIG. 13.

FIG. 14.

FIG. 15.

FIG. 16.

PLATE VI

PLANCHE VI

PLANCHA VI

PLATE VI

Fig. 17. Collection of stones of uniform size and density. Periphery of the stones dense. The fact that there was an increased density about these stones was explained at the time of operation by the density of the bile in which these stones were contained.

Fig. 18. Group of small stones; outline of gall-bladder.

Fig. 19. Same case as Fig. 18, showing barium-filled stomach, taken in upright position. The outline of the gall-bladder is clearly seen. The stones were contained in a dense, dark, tarry bile, the bile casting, relatively, almost as much shadow as the nuclei of the stones. This case illustrates: (1) that the gall-bladder can be visible with or without stones; (2) that the position of the gall-bladder varies in this instance with the position of the stomach when filled; (3) that the stomach is fixed more to the right than in a normal case.

PLANCHE VI

Fig. 17. Collection de calculs ayant même forme et densité. La périphérie est plus opaque que le centre. Une ombre plus dense que les calculs semble les entourer. Elle s'expliqua à l'opération par la présence d'une bile très épaisse, plus opaque aux rayons X que les calculs eux-mêmes.

Fig. 18. Amas de petits calculs; vésicule profilée.

Fig. 19. Le malade de la figure 18, son estomac rempli de baryum et radiographié debout. La vésicule est bien visible. Les calculs baignaient dans une bile épaisse et poisseuse presqu'aussi opaque qu' eux. On voit: (1°) que la vésicule est démontrable, qu'elle contienne ou non des calculs; (2°) que, dans ces cas, lorsqu'on remplit l'estomac, la vésicule se déplace avec lui; (3°) que l'estomac est plus à droite qu'il doit l'être.

PLANCHA VI

Fig. 17. Colección de cálculos con tamaño y densidad uniformes. La periferia es mas opaca que el centro. Una sombra mas densa que los cálculos parece rodearlos. La operación probó que era engendrada por bilis muy espesa.

Fig. 18. Grupo de cálculos pequeños. Visible el perfil de la vesícula.

Fig. 19. El mismo caso de la figura anterior, pero con el estómago lleno de bario y el roentgenograma de pié. El contorno de la vesícula se distingue netamente. Los cálculos estaban bañados por bilis oscura, espesa y pegajosa casi tan opaca como sus núcleos. Este caso sirve para demostrar: (1) que la imagen de la vesícula puede verse, contenga o nó cálculos; (2) que en este sujeto la posición de la vesícula varía con la del estómago lleno de bario y (3) que el estómago ocupa un sitio mas hacia la derecha que en las personas normales.
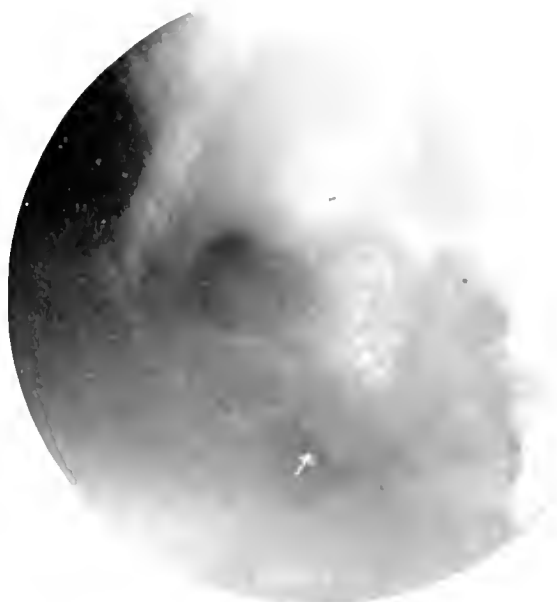
PLATE VI

FIG. 17.

FIG. 18.

FIG. 19.

PLATE VII

PLANCHE VII

PLANCHA VII

PLATE VII

Figs. 20, 21, 22. Variety and location of types of stones found in the study of pathological gall-bladders which contain stones. They should never be overlooked, as they are always visible if searched for. At times, unless due care is taken in regard to the breathing of the patient during examination, one may easily overlook these types, especially those shown in Figs. 16 and 21.

PLANCHE VII

Figs. 20, 21, 22. Divers types de calculs dans des positions différentes. On les découvrira toujours si l'on s'en donne la peine. Ils pourraient demeurer invisibles si la respiration du sujet n'était pas suspendue, particulièrement ceux des figures 16 et 21.

PLANCHA VII

Figs. 20, 21 y 22. Diferentes tipos y situación diversa de cálculos como suelen encontrarse en el estudio de la colecistitis calculosa. Ordinariamente visibles, podrían, no obstante, pasar inadvertidos, si el enfermo no suspende la respiración durante el examen, sobre todo los de les figs. 16 y 21.
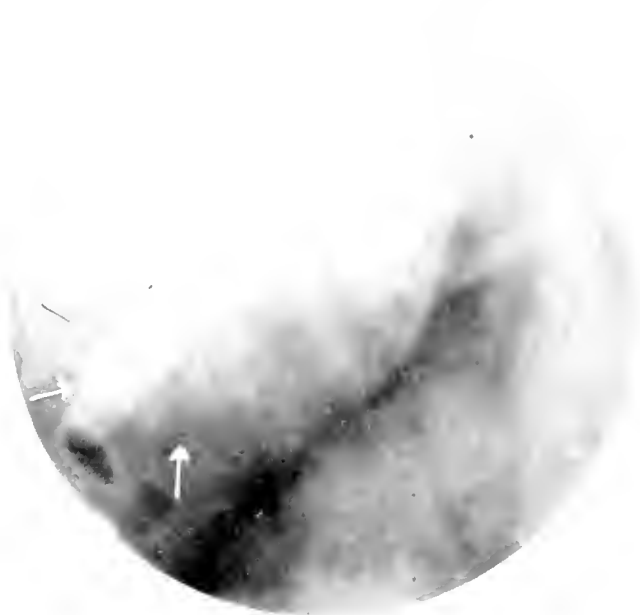
PLATE VII

Fig. 20.

Fig. 21

Fig. 22.

PLATE VIII

PLANCHE VIII

PLANCHA VIII

PLATE VIII

FIG. 23.   Outline of the pathological gall-bladder with bile in one of the ducts. One can see in this duct several stones of negative value, so far as shadow is concerned.

FIG. 24.   Same case as shown in Fig. 23, three months later, after repeated gall-bladder attacks. Duct empty at this time; A, gall-bladder more sharply defined. At operation, a gall-bladder full of small stones was found.

FIG. 25.   A rather uncommon type of gall-bladder full of bilirubin lime stones. They were found to be very small and so friable that they were removed with a good deal of difficulty.

FIG. 26.   Three multiple-faceted stones.

PLANCHE VIII

FIG. 23.   Profil d'une vésicule malade et d'un des canaux rempli de bile. Ce dernier contient plusieurs petits calculs portant des ombres négatives c'est-à-dire plus transparents que leur entourage.

FIG. 24.   Même malade (Fig. 23), 3 mois après. Il a eu plusieurs crises. Cette fois, les canaux biliaires sont vides, mais la vésicule, "A," est plus évidente. A l'opération on la trouva pleine de petits calculs.

FIG. 25.   Une vésicule remplie de calculs à base de bilirubine-chaux. Ils étaient si petits et si friables qu'on eut du mal à les extraire sans les détruire.

FIG. 26.   Trois calculs à facettes multiples.

PLANCHA VIII

FIG. 23.   Contorno de la vesícula enferma y de uno de los conductos lleno de bilis. Dentro del conducto hay varios cálculos con imagen negativa, es decir menos opaca que la bilis circundante.

FIG. 24.   El mismo caso de la fig. anterior 3 meses después, durante los cuales tuvo varios cólicos. El conducto está vacío, pero la vesícula (A) es mas evidente y en la operación se la encontró llena de pequeños cálculos.

FIG. 25.   Caso no frecuente. Vesícula llena de cálculos al bilirubinato de cal. Eran tan pequeños y friables que se extrajeron con suma dificultad.

FIG. 26.   Tres cálculos de facetas múltiples.
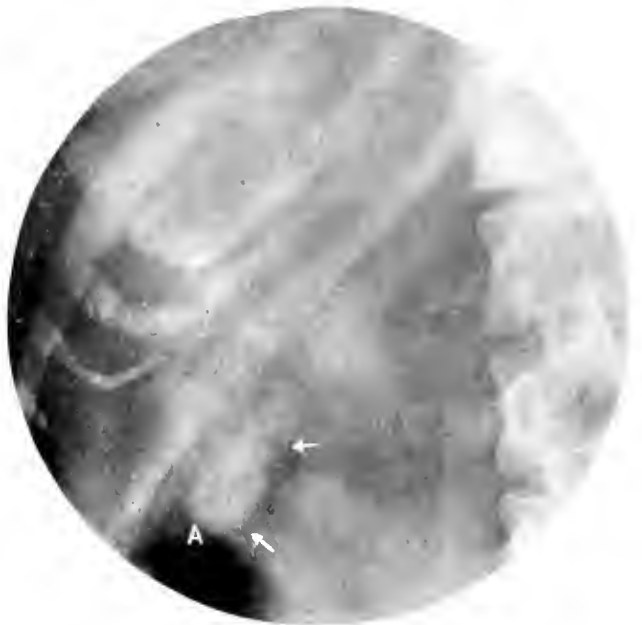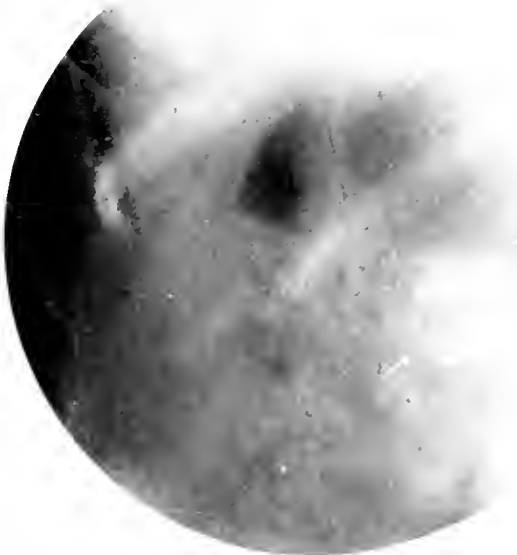
PLATE VIII

FIG. 23.

FIG. 24.

FIG. 25.

FIG. 26.

PLATE IX

PLANCHE IX

PLANCHA IX

PLATE IX

FIG. 27.   One large gall-stone. The gall-bladder and the stone are causing pressure against the antrum of the stomach. This stone was not recognized in the gall-bladder plates or films but was visible during the barium meal. Confirmed at operation.

FIG. 28.   Plate of the gall-bladder region in a large woman, made with the Potter-Bucky diaphragm; brought out more definitely than is possible with the ordinary method. Calcium shadows found near the right transverse process of the second lumbar vertebra.

FIG. 29.   One large gall-stone.

PLANCHE IX

FIG. 27.   Un gros calcul. La vésicule comprime l'antre pylorique. On méconnut ce calcul lors des premiers examens et il ne fut découvert qu'au cours des examens au baryum. Confirmation opératoire.

FIG. 28.   Cliché de la région vésiculaire fait avec l'antidiffuseur Potter-Bucky, chez une grosse femme. Calculs à composition calcaire, visibles près de l'apophyse transverse de la deuxième lombaire. L'antidiffuseur a donné dans ce cas des images meilleures que celles possibles avec la technique ordinaire.

FIG. 29.   Un gros calcul biliaire.

PLANCHA IX

FIG. 27.   Un cálculo voluminoso. La vesícula y la piedra comprimen el antro pilórico. Pasó inadvertida en los roentgenogramas directos de la región; pero se le descubrió al llenar el estómago con bario. Confirmado quirúrgicamente.

FIG. 28.   Placa de la región biliar de una mujer corpulenta, hecha con el antidifusor Potter-Bucky. Cálculos a base de calcio visibles cerca de la apófisis transversa de la segunda lumbar. El antidifusor produjo imágenes mejores que las que hubiera dado el método habitual.
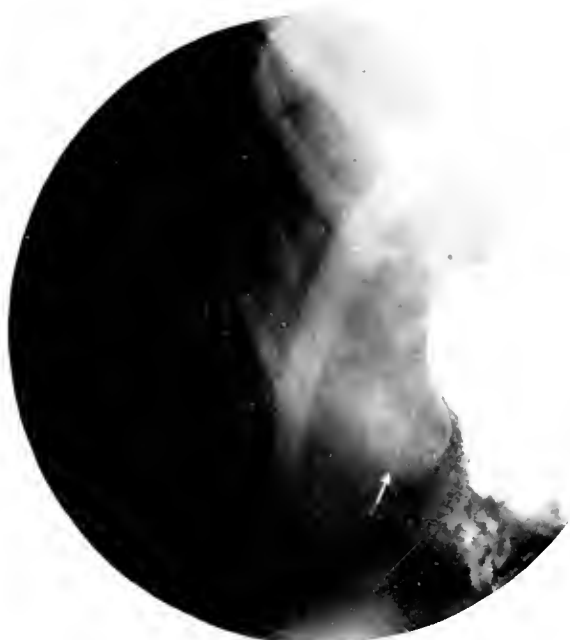
FIG. 29.   Un cálculo biliar voluminoso.

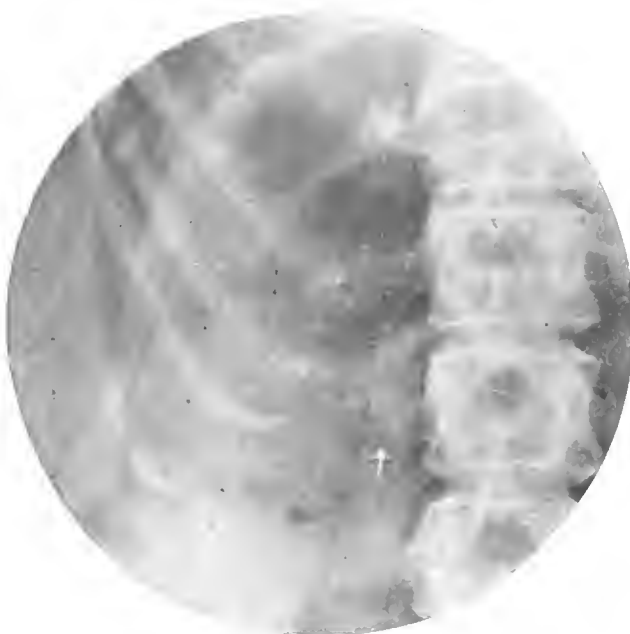PLATE IX

Fig. 27.

Fig. 28.

Fig. 29.

PLATE X

PLANCHE X

PLANCHA X

PLATE X

FIG. 30.   One large laminated gall-stone in a woman, aged thirty; removed.

FIG. 31.   Same case as Fig. 30. Illustrates a plate made with the same technique and in the same position but in which the stone was not visible, due to the patient not holding her breath. Illustrates the care that must be used in observing this one detail of gall-bladder examination. A stone as dense as this one seems to be in Fig. 30, is not visible in any way in Fig. 31; it is entirely obliterated by motion.

FIG. 32.   Plate of a large individual showing group of small stones and pressure of the gall-bladder upon the first portion of the duodenum. This is the type of pressure defect which should always open the question of a possible pathological gall-bladder which may or may not contain stones, since it is the only organ in this region that can produce a deformity of this size and shape, with the remote possibility of an extra lobe of the liver or an increase in a portion of a lobe of the liver. This plate is used not so much to show the stones as to show the characteristic effect of the pressure of the gall-bladder upon the first portion of the duodenum.

FIG. 33.   Case referred as a palpable tumor, possibly of the proximal portion of the transverse colon or hepatic flexure. X-ray examination showed gall-stones in a large gall-bladder with fixation of the gall-bladder to the bowel. Condition confirmed by operation to have been due to a large gall-bladder containing stones.

PLANCHE X

FIG. 30.   Un gros calcul à couches concentriques, en pelure d'oignon. Femme de 30 ans, opérée.

FIG. 31.   Même cas (fig. 30). Ce cliché a été fait dans la même position et avec la même technique que précédemment. Mais le calcul est invisible, le malade n'ayant pas suspendu sa respiration. On voit l'importance de ce dernier détail, puisqu'un calcul aussi visible que celui de la fig. 30 a pu s'évanouir complètement.

FIG. 32.   Cliché d'un patient corpulent montrant un groupe de petits calculs et la pression exercée par la vésicule sur la première portion du duodénum. Une déformation de ce genre doit toujours faire soupçonner la vésicule, car elle seule peut la produire, l'occurrence d'un lobe hépatique hypertrophié ou surnuméraire étant vraiment exceptionnelle.

FIG. 33.   Le malade avait une masse palpable dans l'hypochondre droit, qui pouvait bien être une tumeur du colon à la coudure hépatique ou à la portion initiale du transverse. La radiographie montra des calculs dans une grosse vésicule adhérente à l'intestin. Confirmation opératoire.

PLANCHA X

FIG. 30.   Cálculo de grandes dimensiones y capas concéntricas en una mujer de 30 años; operada.

FIG. 31.   El mismo caso de la 30. Roentgenograma hecho con técnica y posición iguales al anterior, pero el cálculo es invisible, porque la enferma no suspendió la respiración He ahí demostrada la importancia de ese requisito: un cálculo bien visible se esfuma con el movimiento.

FIG. 32.   Placa de un individuo corpulento, mostrando un grupo de pequeños cálculos y la compresión que la vesícula ejerce sobre el primer segmento del duodeno. Deformaciones como ésta deben sugerir siempre la posibilidad de una vesícula biliar enferma, puesto que es el único órgano de la región capaz de producirla con forma y tamaño semejantes; rara vez podrán atribuirse a la presión de un lóbulo hepático hipertrofiado o supernumerario. El objeto principal de este roentgenograma es el de mostrar esa característica deformación.

FIG. 33.   El enfermo presentaba un tumor palpable en el hipocondrio derecho, que bien podría ser un neoplasma de la acodadura hepática o de la porción inicial del colon transverso. El examen roentgenográfico descubrió cálculos biliares en una vesícula grande, adherida al intestino; y la operación confirmó ese diagnóstico.
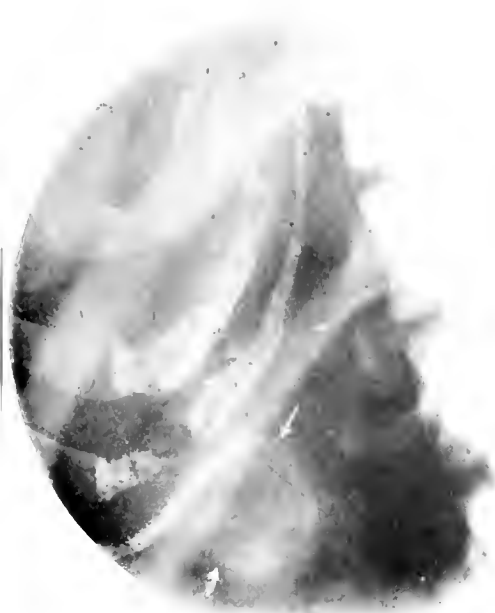
PLATE X

FIG. 30.

FIG. 31.

FIG. 32.

FIG. 33.

PLATE XI

PLANCHE XI

PLANCHA XI

PLATE XI

FIG. 34. Case referred for probable gall-stones. Plates showed a group of small shadows unquestionably due to calcium. Diagnosis: Probable collection of small stones. Operation: Drainage of gall-bladder; no evidence of the stones. Plates made several weeks after operation showed no evidence of these shadows. Conclusion: Either these stones were being passed through one of the ducts at the time of the x-ray examination, or they were lost during drainage.

FIG. 35. Palpable tumor in upper right quadrant, in an elderly woman, found to be due to 3 large gall-stones and several small ones. This plate illustrates the size, position, and pressure of the gall-bladder upon the colon, which one occasionally observes.

FIG. 36. One stone of unusual shape, and of more or less uniform density.

FIG. 37. Group of small stones with very little calcium, showing as much of the outline of the gall-bladder as of the stones. Extremely low penetration is necessary to make these stones visible.

PLANCHE XI

FIG. 34. Diagnostic clinique: Cholélithiase probable. La radiographie montra un groupe de petites ombres évidemment dûes à de la chaux. On en conclut à la présence probable de calculs. La vésicule fut ouverte, on n'y trouva pas de calculs et on la draina. Des clichés pris plusieurs semaines après ne portaient plus les ombres suspectes. Il faut conclure que les calculs étaient en voie d'expulsion lors de la radiographie ou bien qu'ils sont passés inaperçus dans les pansements.

FIG. 35. Masse palpable dans l'hypochondre droit chez une vieille femme. Elle était dûe à trois gros calculs biliaires et plusieurs petits. Le cliché montre la forme et la position de la vésicule ainsi que la pression sur le colon qu'elle exerce parfois.

FIG. 36. Un calcul non homogène; sa forme est exceptionnelle.

FIG. 37. Groupe de calculs pauvres en chaux. Ils ne sont pas plus visibles que les parois de la vésicule.

PLANCHA XI

FIG. 34. Diagnóstico clínico: probable colelitiasis. La radiografía demuestra un grupo de pequeñas sombras, producidas evidentemente per sales de cal. Diagnóstici roentgenológico: probable colección de pequeños cálculos. A la operación no se encontraron cálculos y se drenó la vesícula. Placas tomadas varias semanas después no contenían ya las sombras sospechosas. Es indudable que, una de dos, o los cálculos se expulsaron inmediatamente después del primer examen roentgenólogico o pasaron inadvertidos en el drenaje.

FIG. 35. Tumor palpable en el hipocondrio derecho de una vieja. Era debido a tres gruesos cálculos, acompañados de varios pequeños. Esta placa demuestra el tamaño, posición y compresión de la vesícula sobre el colon, según se observa a veces.

FIG. 36. Un cálculo de forma bizarra y de extructura irregular.

FIG. 37. Grupo de pequeños cálculos pobres en calcio, no más visibles que el contorno de la vesícula. Para obtener su imagen es necesario usar una ampolla blanda.

PLATE XI

FIG. 34.

FIG. 35.

FIG. 36.

FIG. 37.

PLATE XII

PLANCHE XII

PLANCHA XII

PLATE XII

Fig. 38.   Three small stones.

Fig. 39.   One large stone. Note the irregular outline of the peripheral shadow.

Fig. 40.   Gall-bladder area of a woman with roentgen diagnosis of probable stones. A dense shadow, uniform in quality, was found over the edge of the vertebrae. Surgically, proved to be a pancreatic stone, the pancreas containing several stones. (See Fig. 41 for lateral view.)

Fig. 41.   Same case as shown in Fig. 40. Lateral view showing the position of the stone in relation to the duodenum and the posterior wall of the stomach. *A*, stone; *B*, pylorus. Stones not removed at operation. Gall-bladder removed and found pathological.

PLANCHE XII

Fig. 38.   Trois petits calculs.

Fig. 39.   Un gros calcul; noter l'aspect irrégulier de son contour.

Fig. 40.   Région vésiculaire d'une femme suspecte de lithiase biliaire. Une tache opaque recouvre le rebord de la vertèbre. L'opération découvrit un calcul du pancréas. (Voir aussi la figure 41.)

Fig. 41.   Le même calcul (Fig. 40), en latérale. On voit sa position relativement à la paroi postérieure de l'estomac et au duodénum. *A*, calcul.—*B*, pylore.—On laissa les calculs du pancréas; la vésicule étant malade, on l'extirpa.

PLANCHA XII

Fig. 38.   Tres cálculos pequeños.

Fig. 39.   Cálculo voluminoso de contorno irregular.

Fig. 40.   Región biliar de una mujer con diagnóstico roentgenológico de probable colelitiasis. Una sombra de uniforme y marcada densidad cubre el reborde de la vértebra. La operación demostró que se trataba de un cálculo del páncreas que, además, contenía otros. (Véase fig. 41, imagen lateral.)

Fig. 41.   El mismo caso de la fig. 40. Vista lateral enseñando la posición de la piedra en relación con el duodeno y la pared posterior del estómago. *A*, cálculo; *B*, póloro. No se extrajeron los cálculos pancreáticos, pero se extirpó la vesícula enferma.
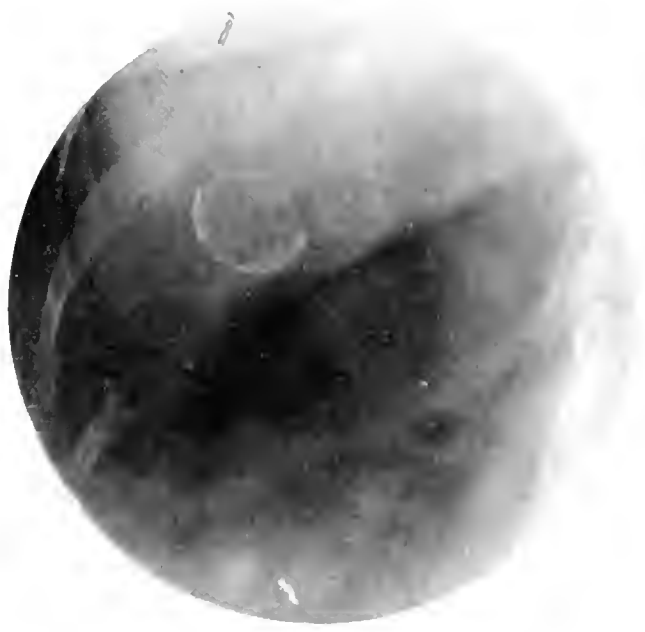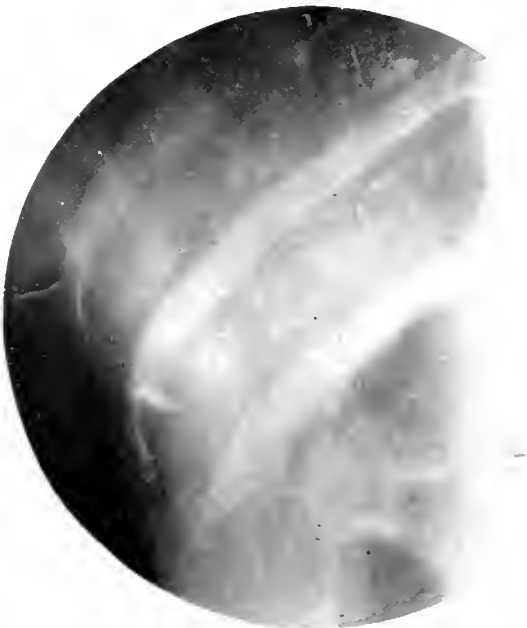
PLATE XII

FIG. 38.

FIG. 39.

FIG. 40.

FIG. 41.

THE VISIBLE PATHOLOGICAL GALL-BLADDER

PLATES XIII to XXIV are used to illustrate, so far as possible, the various types of pathological gall-bladder that one meets with in studying a series of cases, and are chosen to illustrate various sizes, shapes, and positions of the gall-bladder. The mere study of a series of films showing a visible gall-bladder is not so important as using the complete set, including the barium meal. In almost every instance of a definite pathological gall-bladder, we shall observe either indirect or secondary changes. Unfortunately, it is not possible, in every instance, to add to the series of gall-bladder plates the accompanying barium meal films.

The errors that arise in the study of the visible gall-bladder occur in selecting the shadow which is produced by the gall-bladder. The commonest source of error is the visible kidney outline. For some reason not clear to the writers, the kidney becomes, in certain cases (in the female especially), very definitely visible, sometimes in an unusual position, and occasionally a portion of the kidney will show, as the upper pole or the lower pole, or one of its borders, or a high kidney will be seen. These conditions may lead one to suspect the shadow as being due to the gall-bladder. It would seem possible, in every instance, to show the kidney, but it has not been the experience of the writers that even in a very carefully exposed series of films has this always been possible. Occasionally, with what is apparently the clearest and most visible gall-bladder, one may be in error, since this shadow may be the stomach full of the ordinary food meal or liquids. Again, postoperative gall-bladder cases will sometimes reveal, even after the removal of the gall-bladder, shadows that are similar in size, shape and position to the gall-bladder; and we have found surgically, that in some instances this is due to omental fat which has accidentally given us a shadow. Again, extra lobes of the liver, as a caudate or Riedel's lobe, will give us a very definite shadow

PLATE XIII

The arrows point to a visible gall-bladder overlying the upper pole of the kidney. This is the type of a pathological gall-bladder which by its size, shape and position will cause pressure either upon the first portion of the duodenum, or the antrum of the stomach, or the second portion of the duodenum.

PLANCHE XIII

La flèche signale une vésicule visible recouvrant le pôle supérieur du rein. Cèst là le type d'une vescule pathologique pouvant, par ses dimensions sa forme et sa position, exercer une pression soit sur la première portion du duodenum, soit sur l'antre pylorique, soit sur la seconde portion du duodenum.

PLANCHA XIII

Las flechas indican la imagen de la vesícula sobrequesta a la del polo superior del riñón. Es el tipo de vesícula biliar enferma que, por su tamaño, forma y posición, comprime y deforma el bulbo duodenal, el antro pilórico o la segunda porción del duodeno.

that one might mistake for a gall-bladder. This special condition must always be kept in mind; it is in these cases, as in all cases, that the indirect or secondary signs make the diagnosis more definite or less so. Fecal matter in the hepatic colon or proximal portion of the transverse colon may, unless the films are carefully studied, be mistaken for a shadow suggestive of the gall-bladder.

LA VÉSICULE VISIBLE

Les planches XIII à XXIV qui suivent ont été choisies pour illustrer, autant que possible, les divers types de vésicule pathologiques et les variétés de calculs qu'on peut rencontrer. La simple lecture d'une série de plaques où se montre la vésicule est moins utile que l'étude de tout un jeu de plaques où figure aussi l'estomac rempli de baryum. Dans presque tous les cas où la vésicule est visible, no pourra observer des symptômes secondaires où indirects. Malheureusement il n'est pas toujours possible de compléter les examens de la vésicule par l'examen gastro-intestinal.

En recherchant l'image de la vésicule on est exposé à certaines confusions. L'ombre qui prête le plus aux méprises est celle du rein. Pour des raisons que nous ignorons, le rein peut être, surtout chez la femme, très visible; il apparaîtra dans une position insolite, parfois très haut. Ou encore on ne verra qu'une partie de son contour, l'un ou l'autre de ses pôles ou son rebord. Il serait facile de prendre une telle image pour la vésicule. Il n'est pas toujours possible, dans l'expérience des auteurs, de montrer tout le rein, même en multipliant les clichés. Parfois le contenu solide ou liquide de l'estomac peut donner le change. Chez un malade dont la vésicule a été extirpée on trouvera des ombres qui semblent dûes à l'organe absent. L'exploration chirurgicale nous a montré que, dans ces cas, l'ombre provenait des masses graisseuses de l'épiploon. Enfin, des lobes hépatiques, lobes

caudés ou de Riedel, — peuvent simuler la vésicule. On devra toujours penser à ces causes d'erreur et ne pas négliger, pour étayer le diagnostic, les indices accessoires. Bien entendu, des matières fécales, à l'anse hépatique ou dans la première portion du colon, sont capables de fournir des images semblables à celles de la vésicule.

IMAGEN ROENTGENIANA DE LA VESICULA BILIAR ENFERMA

Los clisés XIII y XXIV se eligieron con el propósito de ilustrar, en todo lo posible, los diversos tipos de vesícula biliar enferma y las situaciones distintas en que el investigador puede encontrar la cuando estudie un grupo de casos. La mera lectura de una serie de películas en que se muestre la vesícula no tiene tanta importancia como el estudio de un juego completo, que incluya la imagen del estómago lleno de bario. En casi todos los casos de enfermedad de la vesícula biliar se observarán síntomas indirectos o secundarios. Por desgracia, no siempre es posible completar el examen de las vías biliares con el del tubo digestivo.

Los errores que se cometen en el estudio de la vesícula biliar dependen, en su mayor parte, de una equivocada selección de la sombra que ha de corresponderle en la placa. La causa mas frecuente de error es el riñón derecho, cuya sombra, por razones que ignoramos todavia, se muestra en ciertos casos, pero sobre todo en las mujeres, claramente visible, apareciendo, unas veces, en posición insólita, algunas, situado muy arriba y otras, destacando solamente la silueta del reborde o de uno de sus polos, bien sea el inferior o ya el superior; circunstancias todas que favorecen la confusión de estas sombras con las de la vesícula biliar, tanto más cuanto que, según nuestra experiencia, no es posible, ni aún multiplicando los clisés, obtener en todos los casos la imagen total del riñón. A veces podría tomarse por la sombra de una vesícula bien visible lo que no es otra cosa que el estómago lleno de

líquido o de materiales alimenticios. Mas todavía; un operado de colecistectomía puede mostrar, algun tiempo después, en la region biliar sombras similares, por su tamaño, forma y posición a la de la vesícula; y sin embargo, la experimentación quirúrgica nos ha demostrado que, en ciertos casos, dichas imágenes son producidas por masas grasosas, epiploicas. Además, algunos lóbulos accesorios del higado, como el lóbulo caudado o de Riedel, suelen proyectar sombras confundibles con las vesiculares; y por último, también originan imágenes parecidas los resíduos fecales en la acodadura hepática del colon o en la primera porción de su segmento transverso. Tales causas de error no deben descuidarse, puesto que se entonces que el estudio metódico de los signos indirectos o secundarios constituye un auxiliar poderoso para el esclarecimiento del diagnóstico.

PLATE XIV

PLANCHE XIV

PLANCHA XIV

PLATE XIV

Fig. 42. Woman, aged forty. Two definite shadows in the upper right quadrant, outlined on plate with arrows. The upper shadow is consistent with the kidney; the lower by its size and shape is consistent with the gall-bladder. At operation, a gall-bladder more of the size and shape of the upper shadow was found. There were no secondary changes except the very high position of the hepatic flexure, and about the hepatic flexure were very fine, indefinite adhesions which extended to the under surface of the liver and near the gall-bladder. It is our opinion that the lower shadow was the gall-bladder; the upper, that of a high kidney.

Fig. 43. Man, aged forty-five. Definite outline of the gall-bladder (A) overlying the upper pole of the kidney. Within the shadow of the gall-bladder two areas are seen which proved at operation to be 2 stones that did not cast any shadow. One stone is shown in the common duct (B).

Fig. 44. Outline of the gall-bladder in a large man. No stones were found at operation, but dark, tarry bile. There were no definite indirect or secondary manifestations.

PLANCHE XIV

Fig. 42. Femme de 40 ans. Deux ombres nettes dans l'hypochondre, indiquées par des flèches. L'ombre supérieure peut se rapporter au rein; l'inférieure, par sa forme et ses dimensions, à la vésicule. A l'opération on trouva une vésicule correspondant plutôt à l'ombre supérieure. Rien d'autre, si ce n'est que l'anse hépatique était très haut, et qu'autour d'elle il y avait des adhérences très fixes s'étendant sous le foie et dans le voisinage de la vésicule. Nous croyons que l'ombre supérieure était bien celle de la vésicule et l'autre, celle d'un rein haut-situé.

Fig. 43. Homme de 45 ans. Vésicule nettement dessinée en A, recouvrant le pôle supérieur du rein. Dans les limites de l'ombre portée par la vésicule, deux îlots que l'opération démontra être des calculs. Un calcul, B, est dans le canal cholédoque.

Fig. 44. Vésicule visible chez un homme corpulent. On trouva une vésicule remplie de bile poisseuse, sans calculs. Pas de manifestations secondaires.

PLANCHA XIV

Fig. 42. Mujer de 40 años. Dos sombras netas eu el hipocondrio derecho, señaladas en el clisé por flechas: la superior parece corresponder al riñón; la inferior se parece, por la forma y tamaño, a la de la vesícula. La operación descubrió una vesícula de aspecto semejante a la sombra superior. No había otras alteraciones secundarias que la posición elevada del codo hepático del colon y la presencia a su alrededor de finas adherencias extendidas a la cara inferior del hígado y en la vecindad de la vesícula. Nosotros creemos, sin embargo, que la sombra inferior correspondía a la vesícula y la superior a un riñón situado muy arriba. He ahí un ejemplo de lo difícil que suele ser el reconocimiento de la sombra vesicular.

Fig. 43. Hombre de 45 años. Contorno bien definido de la vesícula (A) sobrepuesto al polo superior del riñón; dentro de la imagen de la vesícula se ven dos áreas, que la operación demostró ser dos cálculos que no habían dado sombras precisas. Uno de ellos se encontraba en el colédoco (B).

Fig. 44. Contorno de la vesícula en un hombre corpulento. La operación no descubrió cálculos, sinó bilis oscura y espesa. No había tampoco manifestaciones indirectas o secundarias.
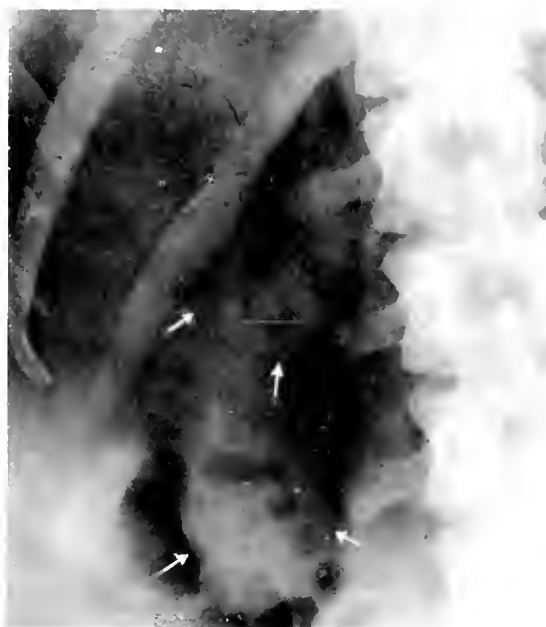
PLATE XIV

Fig. 42.

Fig. 43.

Fig. 44.

PLATE XV

PLANCHE XV

PLANCHA XV

PLATE XV

Fig. 45. Woman, aged twenty-three. Definite outline of the gall-bladder. Shadow dense in character, the shape and size of the gall-bladder.

Fig. 46. Same case as shown in Fig. 45, showing pressure on the duodenum. It is of interest to note that in plates or films of the stomach made with more penetration than would be used in gall-bladder examination, we lose the outline of the gall-bladder but see the effect of the gall-bladder upon the first portion of the duodenum. This case illustrates the necessity of extreme care in exposures taken to determine the visible gall-bladder. Operation showed no evidence of stones. Extremely dark bile.

Fig. 47. Woman, aged forty, with indefinite clinical symptoms. Plates of the gall-bladder region showed a visible gall-bladder.

Fig. 48. Same case as illustrated in 7. Fig.4 Lateral view, showing the pressure of this mass upon the beginning of the second portion of the duodenum. At operation, the pathological gall-bladder with fixation to the duodenum was found.

PLANCHE XV

Fig. 45. Femme de 23 ans. L'ombre, bien évidente, est caractéristique de la vésicule.

Fig. 46. Même malade (fig. 45). On voit la pression exercée sur le duodénum. Il est intéressant de noter que, dans les clichés faits de l'estomac, avec des rayons relativement pénétrants, la vésicule s'évanouit; mais son effet sur le duodénum se montre quand même. On voit quel soin il faut y mettre si l'on veut pouvoir montrer le vésicule. A l'opération: bile très foncée, sans calculs.

Fig. 47. Femme de 40 ans, avec symptômes cliniques vagues. La vésicule est visible sur les radios.

Fig. 48. Même cas (fig. 47). La vue latérale montre la pression exercée sur le commencement de la seconde portion du duodénum. A l'opération: vésicule malade, fixée au duodénum.

PLANCHA XV

Fig. 45. Mujer de 23 años. Contorno vesicular bien definido. Es una imagen característica.

Fig. 46. El mismo caso anterior, mostrando la compresión del duodeno. Es interesante observar que en los clisés del estómago hechos con una ampolla mas dura que las empleadas para el examen de la vesícula la imagen de este último órgano desaparece, pero se nota el efecto de su presión sobre el primer segmento del duodeno. Véase, pues, cuanto cuidado necesitan lo roentgenogramas que muestran la imagen de la vesícula. La operación sólo descubrió bilis oscura, sin cálculos.

Fig. 47. Mujer de 40 años, con síntomas clínicos indefinidos. Vesícula visible en los clisés.

Fig. 48. El mismo caso de la fig. 47. Vista lateral. Obsérvese la compresión sobre la porción inicial del segundo segmento del duodeno. En la operación se encontró la vesícula adherida al duodeno.

PLATE XV

FIG. 45.

FIG. 46.

FIG. 47.

FIG. 48.

PLATE XVI

PLANCHE XVI

PLANCHA XVI

PLATE XVI

Fig. 49. Distinct shadows, unquestionably due to calcium. These shadows indicate stones in the gall-bladder and possibly in the duct, judging partly from their unusual shape and partly from their unusual position. This is particularly well emphasized in the lateral view (not given here), which shows shadows to be in the position of the normal gall-bladder and not in the position of the normal kidney.

Fig. 50. Same case as illustrated in Fig. 49. Shows the shadows in relation to the first and second portions of the duodenum, which knowledge helps to confirm the probability of these being stones within the gall-bladder or duct. The lateral view shows these shadows to be in the position of the normal gall-bladder, in relation to the normal kidney position. At operation, 4 rounded stones were found in the gall-bladder, the largest an inch in diameter. Two elongated stones were found in the common duct. The gall-bladder was adherent to the under surface of the liver, but there were no adhesions involving the other organs.

Fig. 51. Visible gall-bladder with fixation of the stomach. The shadow was found only through the series of stomach plates.

PLANCHE XVI

Fig. 49. Ombres très nettes, évidemment dûes à de la chaux. Elles dénotent des calculs dans la vésicule, et aussi dans les canaux biliaires, si l'on en juge par la forme et les dimensions anormales de certaines ombres. Une radiographie en latérale, que nous ne reproduisons pas ici, montre qu'il faut tout rapporter à la vésicule et non au rein.

Fig. 50. Le cas précédent (fig. 49). On voit le rapport des ombres suspectes avec les deux premières portions du duodénum. Ceci incline davantage à penser qu'il s'agit de calculs de la vésicule et des canaux. Les rapports avec le rein sont normaux. A l'opération : 4 calculs arrondis dans la vésicule, le plus gros ayant 25 mms. de diamètre. Deux calculs effilés dans le canal cholédoque. Rien d'autre à part l'adhérence de la vésicule à la face inférieure du foie.

Fig. 51. Vésicule visible, estomac fixé. On ne trouva la vésicule qu'au cours de la série gastrique.

PLANCHA XVI

Fig. 49. Sombras evidentes, de indudable origen cálcico. Indican cálculos en la vesícula y probablemente en el conducto, si se juzgan por su forma y situación anormales. Esto se nota mejor en la vista lateral (no mostrada aquí) que presenta dichas sombras en la región de la vesícula y no en la renal.

Fig. 50. El mismo de la figura 49. Véanse las relaciones de las sombras sospechosas con las dos primeras porciones del duodeno, noción que viene a reforzar el diagnóstico probable de cálculos de la vesícula y conductos biliares. La vista lateral demuestra que las relaciones con el riñón son normales. La operación descubrió 4 piedras redondas en la vesícula, una de ellas midiendo 25 milímetros de diámetro; y dos alargadas en el colédoco. La vesícula adhería a la cara inferior del hígado. No había otras adherencias.

Fig. 51. Vesícula visible adherida al estómago. Solo pudo demostrarse durante el examen con desayuno opaco.

PLATE XVI

FIG. 49.

FIG. 50.

FIG. 51.

PLATE XVII

PLANCHE XVII

PLANCHA XVII

PLATE XVII

Fig. 52. Large visible pathological gall-bladder containing calcium shadows. (It will be noted that the lines of the gown the patient wore are shown.) This case illustrates the extreme care on exposure that was necessary to bring out the outline of this gall-bladder. Technically, the difficulty in making this examination was the over-penetration which would obscure the outline of the gall-bladder. It was only when using a very low spark gap, very high milliamperage and a very rapid exposure, with forced development, that we could get the outline of this gall-bladder.

Fig. 53. Woman, aged fifty, showing a visible gall-bladder containing only dense, tarry bile.

Fig. 54. Woman, aged twenty-eight, operated upon for chronic cholecystitis several years previous; drained. Complete recovery. Return of symptoms prior to this examination. Roentgen films showed visible gall-bladder with fixation of the stomach in the area of the shadow. Operation confirmed roentgen findings.

Fig. 55. Visible gall-bladder. Surgically: Chronic cholecystitis, without stones.

PLANCHE XVII

Fig. 52. Grosse vésicule visible encadrant des ombres calcaires. On peut juger du soin qu'il fallut apporter à la technique par la présence des ombres vestimentaires. Un rayonnement dur eût effacé le profil de la vésicule. Seuls un rayonnement très mou, avec fort courant et brève exposition purent la mettre en évidence.

Fig. 53. Femme de 50 ans; sa vésicule, visible, ne contenait que de la bile épaisse, poisseuse.

Fig. 54. Femme de 28 ans opérée plusieurs années auparavant pour cholécystite. Guérison complète après drainage. Réapparition des troubles. A la radio, vésicule visible avec estomac fixé dans les limites de l'aire vésiculaire. Confirmation opératoire.

Fig. 55. Vésicule visible. A l'opération: cholécystite chronique non-calculeuse.

PLANCHA XVII

Fig. 52. Voluminosa vesícula conteniendo sombras calcáreas. La presencia en el clisé de algunas imágenes vestimentarias da clara idea de la delicadeza de técnica necesaria para demostrar la vesícula: empleando rayos duros no se hubiera obtenido su imagen, mientras que el éxito fué posible con una breve exposición a rayos muy blandos y gran miliamperaje. Hubo necesidad también de forzar el desarrollo.

Fig. 53. Mujer de 50 años, mostrando una vesícula llena de bilis espesa y pegajosa.

Fig. 54. Mujer de 28 años, operada varios años antes por colecistitis crónica. Drenaje de la vesícula y curación inmediata. Reaparición de los síntomas y necesidad de un nuevo examen. El roentgenograma demostró la vesícula visible y el estómago arrastrado, y fijo por adherencias a la sombra vesicular. La operación confirmó el diagnóstico.

Fig. 55. Vesícula visible. A la operación, colecistitis crónica no calculosa.

PLATE XVII

FIG. 52.

FIG. 53.

FIG. 54.

FIG. 55.

PLATE XVIII

PLANCHE XVIII

PLANCHA XVIII

PLATE XVIII

Fig. 56. Definite shadow in the region of the gall-bladder. Roentgen diagnosis: Probable pathological gall-bladder which may or may not contain stones. Surgically: Moderately dilated gall-bladder full of calcium bilirubin stones.

Fig. 57. Visible gall-bladder in a case apparently similar to the case shown in Fig. 56, but containing pure bilirubin lime stones in large numbers.

Fig. 58. Definite outline of the lower pole of the right kidney. Over upper pole is a dense shadow which was reported as probably a pathological gall-bladder. Surgically: Chronic cholecystitis. It was with great difficulty that the differential diagnosis between the shadow over the upper pole of the right kidney and the shadow produced by the upper pole of the right kidney could be made. The diagnosis from the roentgen standpoint was doubtful. At operation, a definite pathological gall-bladder was found.

PLANCHE XVIII

Fig. 56. Ombre nette dans la région de la vésicule. Diagnostic radiologique: vésicule probablement malade, lithiase douteuse. A l'opération: vésicule moyennement dilatée remplie de calculs à base de bilirubine-chaux.

Fig. 57. Vésicule visible, dans un cas analogue au précédent. Elle contient beaucoup de calculs de bilirubinate de chaux pur.

Fig. 58. Le pôle inférieur du rein droit, nettement profilé. Recouvrant le pôle supérieur, une ombre intense qu'on signala comme étant probablement la vésicule. A l'opération: cholécystite. On eut beaucoup de mal à différencier l'ombre du pôle supérieur d'avec l'ombre sus-jacente. Le diagnostic radiologique était hésitant. A l'opération on trouva une vésicule évidemment malade.

PLANCHA XVIII

Fig. 56. Sombra precisa en la región biliar. Diagnóstico roentgenológico: probable colecistitis crónica, con o sin cálculos. A la operación: vesícula medianamente dilatada llena de cálculos de bilirubinato de cal.

Fig. 57. Vesícula visible en un caso análogo al precedente, conteniendo gran número de cálculos de bilirubinato de cal puro.

Fig. 58. Contorno preciso del polo inferior del riñón derecho. Sobre el polo superior se nota una sombra densa que se creyó pertenecer a una vesícula enferma. A la operación, se confirmó la colecistitis. La diferenciación entre la sombra del polo superior del riñón y la de la vesícula, superpuesta, fue muy difícil. El diagnóstico roentgenológico era dudoso. La intervención descubrió una vesícula evidentemente enferma.

PLATE XVIII

FIG. 56.

FIG. 57.

FIG. 58.

PLATE XIX

PLANCHE XIX

PLANCHA XIX

PLATE XIX

Fig. 59. Two distinct shadows, one due to the gall-bladder (*A*), the other, the lower pole of kidney (*B*). The gall-bladder contained a large number of pure bilirubin lime stones.

Fig. 60. Pathological gall-bladder, apparently without stones, and pressure on antrum of stomach. Surgically: Chronic cholecystitis.

Fig. 61. Pathological gall-bladder containing small stones.

Fig. 62. Visible gall-bladder in a woman. Surgically: Chronic cholecystitis, with one stone in the common duct, which was not visible on examination. This examination was made at the twenty-four-hour period.

PLANCHE XIX

Fig. 59. Deux ombres bien définies; l'une, *A*, dûe à la vésicule; l'autre, *B*, au pôle inférieur du rein. La vésicule contenait de nombreux calculs de bilirubinate de chaux.

Fig. 60. Même malade. On voit ici la pression exercée par la vésicule sur la première portion du duodénum.

Fig. 61. Vésicule malade contenant des petits calculs.

Fig. 62. Vésicule visible chez une femme. A l'opération: cholécystite chronique, avec un calcul dans le canal cholédoque. Il était demeuré invisible à la radiographie.

PLANCHA XIX

Fig. 59. Dos sombras bien definidas: una (A) es la de la vesícula y la otra (B) del polo inferior del riñón. La vesícula contenía numerosos cálculos de bilirubinato de cal puro.

Fig. 60. Vesícula enferma, aparentemente sin cálculos, pero comprimiendo el antro pilórico. A la operación, colecistitis crónica.

Fig. 61. Vesícula enferma conteniendo cálculos pequeños.

Fig. 62. Vesícula visible en una mujer. A la operación; colecistitis crónica con un cálculo en el colédoco que no se reveló durante el examen. Este examen se hizo 24 horas después de ingerido el desayuno opaco.
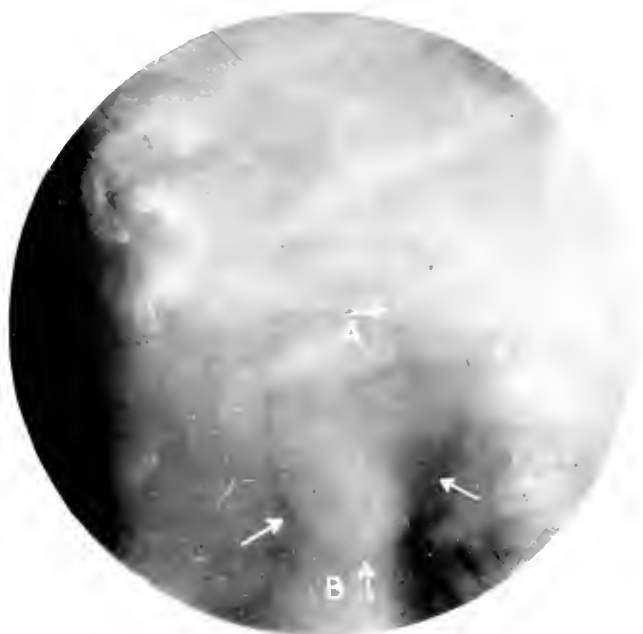
PLATE XIX

FIG. 59.

FIG. 60.

FIG. 61

FIG. 62.

PLATE XX

PLANCHE XX

PLANCHA XX

PLATE XX

Fig. 63. Definite pathological gall-bladder with no evidence of stones. (See Fig. 64 for surgical findings.)

Fig. 64. Gall-bladder after removal, showing the gall-bladder, before opening, to contain one large stone. Note in this instance that the periphery of the stone shows no calcium deposit. Nucleus of stone faintly visible; extreme thickness of gall-bladder wall. Roentgen diagnosis: Pathological gall-bladder. Surgically: One large gall-stone was found.

Fig. 65. Plate made several days after the gastro-intestinal examination for confirmation of a shadow found in the previous gall-bladder plates. Original plates showed a definite, visible gall-bladder. Surgically. Chronic cholecystitis without stones.

Fig. 66. Large, dense gall-bladder and several stones. It is interesting that in this case, throughout the examination, stones would appear and disappear; in some plates there were several; in others, only one. At operation a large gall-bladder full of inspissated bile and pus was found, with a number of dense calcium stones.

PLANCHE XX

Fig. 63. Vésicule visible, sans calcul apparent. Voir plus loin pour les constatation opératoires.

Fig. 64. La vésicule extraite, avant d'être ouverte. Elle contient un gros calcul. Noter qu'il n'y a pas de calcium dans les couches extérieures. Le noyau est faible mentvisible. Les parois de la vésicule sont très épaisses. Diagnostic radiologique: vésicule malade. Constatations opératoires: calculs.

Fig. 65. Cliché fait plusieurs jours après un exsmen gastro-intestinal dans le but de retrouver des ombres nettement perçues sur les radiographies consacrées spécialement à la vésicule.

Fig. 66. Grosse vésicule très dense, contenant plusieurs calculs. Fait curieux, l'aspect a varié d'un cliché à l'autre. Certaines plaques montraient plusieurs calculs, d'autres un seul. A l'opération: grosse vésicule remplie de bile épaissie et de pus, avec plusieurs calculs à forte teneur en chaux.

PLANCHA XX

Fig. 63. Vesícula evidentemente enferma y visible, sin cálculo aparente (Véase la fig. 64 para las observaciones quirúrgicas).

Fig. 64. La vesícula extirpada deja ver, antes de abrirla, un cálculo grande—Nótese que la periferia no contiene sales de calcio. El núcleo es ligeramente visible. Las paredes de la vesícula son muy gruesas. Diagnóstico roentgenológico: Colecistitis crónica. Observación quirúrgica: un cálculo voluminoso.

Fig. 65. Roentgenograma hecho algunos dias después de un examen gastro-intestinal, para confirmar la presencia de una sombra encontrada en anteriores exámenes particulares de la vesícula. Las placas originales mostraban distintamente la vesícula biliar, La operación descubrió una colecistitis crónica no calculosa.

Fig. 66. Vesícula grande y de paredes gruesas conteniendo varias piedras. Es interesante advertir que durante el examen de este caso los cálculos se revelaron inconstantemente visibles; mientras que algunos clisés exhiben varios, otros no muestran mas que uno. A la operación se encontró una vesícula grande llena de bilis espesa y pus, conteniendo muchos cálculos ricos en calcio.

PLATE XX

FIG. 63.

FIG. 64.

FIG. 65.

FIG. 66.

PLATE XXI

PLANCHE XXI

PLANCHA XXI

PLATE XXI

FIG. 67.   Large gall-bladder high up in the right quadrant, which could not be confused in the original plates with the kidney. Very dense. At operation, it was found to contain some very small bilirubin lime stones, but density in plates was due to the extreme density of the bile and to the partial obstruction of the cystic duct.

FIG. 68.   Definite, visible gall-bladder with some secondary manifestations in the gastro-intestinal examination   enough to confirm the opinion that this shadow represented the gall-bladder. Surgically: Chronic cholecystitis without stones.

FIG. 69.   Pathological gall-bladder with small stones.

FIG. 70.   Pathological gall-bladder without stones.

PLANCHE XXI

FIG. 67.   Grosse vésicule haut située dans l'hypochondre droit. Impossible à confondre avec le rein. A l'opération on y trouva de très petits calculs de bilirubinate de chaux, mais l'opacité était surtout dûe à la consistance épaisse de la bile et à une obstruction du canal cystique.

FIG. 68.   Ombre définie pouvant être la vésicule. Confirmation suffisante par les symptômes secondaires constatés au cours de l'examen gastro-intestinal. A l'opération: cholécystite chronique, sans calculs.

FIG. 69.   Vésicule visible. Elle est malade.

FIG. 70.   Vésicule malade, sans calculs.

PLANCHA XXI

FIG. 67.   Vesícula grande en la región mas alta del hipocondrio derecho, imposible de confundir con el riñón. Imagen muy densa. A la operación contenía algunos cálculos pequeños de bilirubinato de cal; la opacidad era debida a la consistencia espesa de la bilis y a una obstrucción parcial del conducto cístico.

FIG. 68.   Vesícula biliar bien visible. Los síntomas secundarios revelados por el examen gastro-intestinal corroboran esta opinión. A la operación, colecistitis crónica no calculosa.

FIG. 69.   Vesícula enferma con pequeños cálculos.

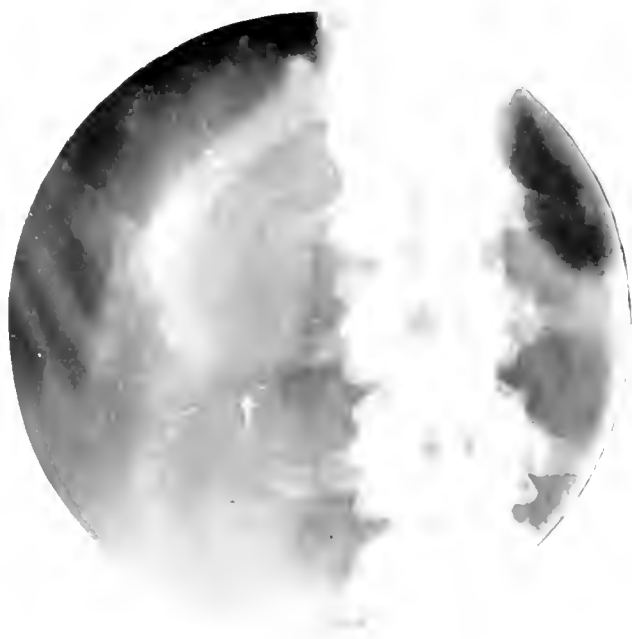FIG. 70.   Vesícula enferma sin cálculos.
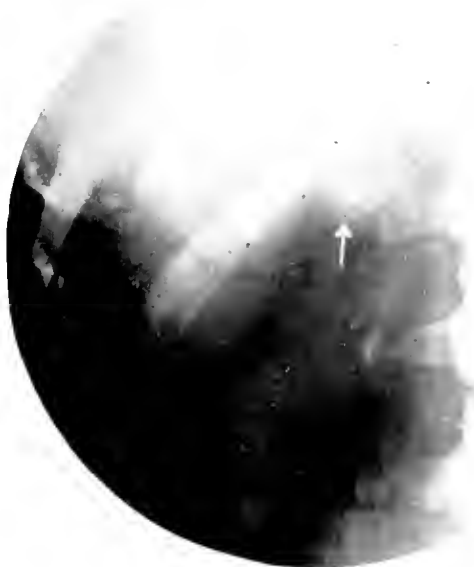
PLATE XXI

FIG. 67.

FIG. 68.

FIG. 69.

FIG. 70.

PLATE XXII

PLANCHE XXII

PLANCHA XXII

PLATE XXII

Fig. ⁻1. Large pathological gall-bladder which is displacing the ascending colon and hepatic flexure, due to hydrops of the gall-bladder.

Fig. ⁻2. Shadow of a large gall-bladder. The position of the second portion of the duodenum is significant as suggesting fixation. Surgically: Hydrops of the gall-bladder. This plate was made in 1913; it was confirmed at operation several years later.

Fig. ⁻3. Woman, aged sixty. Referred as a palpable tumor in the upper right quadrant. Clinical diagnosis: Probable carcinoma of the stomach. X-ray examination of the stomach, negative. This plate, made at six hours, outlined a large gall-bladder. Surgically: Hydrops of the gall-bladder. This shadow was not determined in the routine gall-bladder examination, as the fundus of the gall-bladder was below the area examined.

PLANCHE XXII

Fig. ⁻1. Épanchement dans la vésicule. Elle déplace le colon ascendant et l'anse hépatique.

Fig. ⁻2. Image d'une grosse vésicule. La position de la seconde portion du duodénum fait penser à une fixation. Cliché fait en 1913; plusieurs années après, l'opération révéla un épanchement dans la vésicule.

Fig. ⁻3. Femme de 60 ans. Tumeur palpable dans l'hypochondre droit. Diagnostic clinique: cancer probable de l'estomac. L'examen radiologique ne révéla aucun signe de cancer. Sur le cliché ci-joint, fait 6 heures après ingestion de baryum, la vésicule se montre. Elle n'avait pas été vue dans la série prégastrique. A l'opération: épanchement dans la vésicule.

PLANCHA XXII

Fig. ⁻1. Hidropesía de la vesícula. El colon ascendente y la acodadura hepática aparecen desplazados.

Fig. ⁻2. Imagen de una vesícula grande. La posición del segundo segmento del duodeno sugiere la posibilidad de adherencias y fijación. La placa se hizo en 1913; varios años después la operación reveló una hedropesía de la vesícula.

Fig. ⁻3. Mujer de 60 años. Presenta un tumor palpable en el hipocondrio derecho Diagnóstico clínico: probable carcinoma gástrico. Examen roentgenológico del estómago, negativo. Este clisé fue hecho seis horas después de la comida opaca y ofrece la imagen de una vesícula grande; imagen que no pudo observarse durante el examen particular de la vesícula, porque su fondo descendía por debajo del área examinada. A la operación, hidropesía de la vesícula.
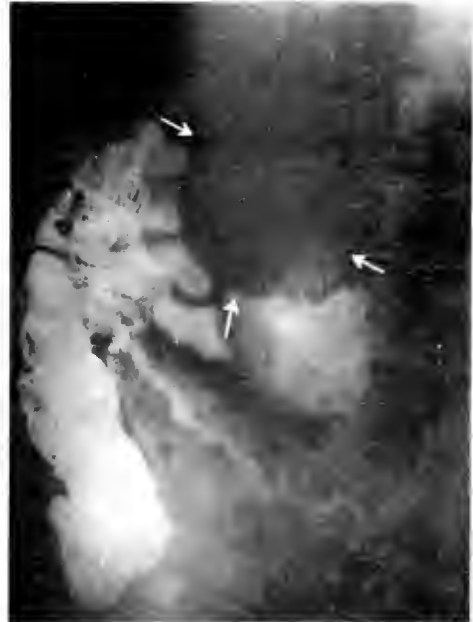
PLATE XXII

FIG. 71.

FIG. 72.

FIG. 73.

PLATE XXIII

PLANCHE XXIII

PLANCHA XXIII

PLATE XXIII

Fig. 74. Large pathological gall-bladder, very easy to visualize under proper technique. Unfortunately in this series of plates we were unable to determine the exact position of the kidney. The question whether this was the kidney or not was difficult to decide. There were no other changes, either direct or secondary, that were of help in determining this problem. Clinically, there was an easily palpable gall-bladder; surgically, the gall-bladder removed was approximately the size of the shadow. The surgeon doubted whether the shadow found in the x-ray plate was the gall-bladder. The writers are of the opinion that this shadow represented the gall-bladder.

Fig. 75. Large shadow which might be confused with a possible displaced kidney. Clinically, a palpable tumor; under fluoroscopic examination, palpable and tender. There are some changes caused by the displacement of the colon which would indicate that it was the gall-bladder. Surgically, the tumor proved to be a moderate hydrops of the gall-bladder.

PLANCHE XXIII

Fig. 74. Grosse vésicule malade, facile à mettre en évidence avec une technique appropriée. Malheureusement, on ne put déterminer la position du rein sur aucun des clichés de la série. Rein ou vésicule? La réponse n'était pas facile, aucun symptôme indirect n'étayant le diagnostic. Au palper on sentait la vésicule. A l'opération, celle qui fut extraite avait à-peu-près les dimensions de l'ombre figurée. Bien que le chirurgien fut de l'avis contraire, nous croyons avoir montré la vésicule.

Fig. 75. Cette ombre étendue pourrait faire croire à un rein déplacé. Elle représentait une masse palpable, douloureuse à la pression. On l'attribua à la vésicule, à cause d'un déplacement particulier du colon. L'opération montra un épanchement dans la vésicule.

PLANCHA XXIII

Fig. 74. Vesícula grande enferma, fácil de demostrar con una técnica correcta Desgraciadamente en ninguna de las placas pudimos precisar la situación del riñón. Era difícil decidir si se trataba del riñón o de la vesícula, pues faltaban signos indirectos o secundarios que habrían ayudado el diagnóstico. Clínicamente, sin embargo, había una vesícula fácilmente palpable. La operación descubrió y extirpó una vesícula de tamaño aproximado al de la sombra del clisé. Aunque el cirujano dudó de que dicha sombra fuera la imagen de la vesícula, nosotros creimos que sí lo era.

Fig. 75. Sombra extensa fácil de confundir con un riñón flotante. Clínicamente era un tumor palpable; al examen fluoroscópico, masa palpable y sensible. En vista del desplazamiento evidente del colon, se atribuyó la sombra a la vesícula biliar. La intervención quirúrgica probó que el tumor era la vesícula hedrópica.
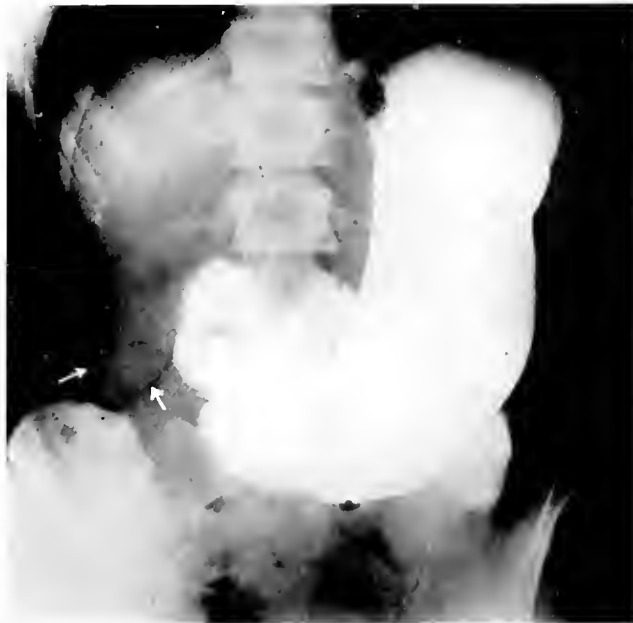
PLATE XXIII

FIG. 74.

FIG. 75.

PLATE XXIV

PLANCHE XXIV

PLANCHA XXIV

PLATE XXIV

Fig. 76. Definite pathological gall-bladder, easily visible by the plate or film method. This patient had been examined by the fluoroscopic method; no evidence of a pathological gall-bladder. Confirmed at operation.

Fig. 77. Visible gall-bladder, moderate in size, fixed to the hepatic flexure. Plate shows a picking up of the colon by adhesions. Surgically: Chronic cholecystitis, with adhesions.

Fig. 78. Large bowel full of barium by the enema method; visible gall-bladder, which had been confirmed by a series of gall-bladder plates, and was proved pathological at operation.

Fig. 79. Outline of a pathological gall-bladder overlying the shadow of the kidney.

PLANCHE XXIV

Fig. 76. Une vésicule bien définie, facile à radiographier sur plaques ou films. Une radioscopie n'avait rien montré de suspect.

Fig. 77. Vésicule de moyenne taille, fixée à l'anse hépatique. On voit que le colon est tiraillé par des adhérences. A l'opération: cholécystite chronique, avec adhérences.

Fig. 78. Colon rempli de baryum par voie rectale. La vésicule biliaire est visible, comme d'ailleurs sur les plaques consacrées spécialement à sa recherche. Elle était malade.

Fig. 79. Profil d'une vésicule malade recouvrant celui du rein.

PLANCHA XXIV

Fig. 76. Vesícula evidentemente enferma, de fácil demostración roentgenográfica. El examen fluoroscópico, sin embargo, fué negativo. Confirmación quirúrgica.

Fig. 77. Vesícula de tamaño moderado fijada a la acodadura hepática del colon. El clisé muestra cómo las adherencias agarran el colon. Comprobación quirúrgica: colecistitis crónica adhesiva.

Fig. 78. Colon lleno con un enema opaco. Vesícula visible, según había demostrado ya otra serie de placas. A la operación, colecistitis crónica.

Fig. 79. Imagen de la vesícula biliar enferma sobrepuesta a la sombra del riñon.
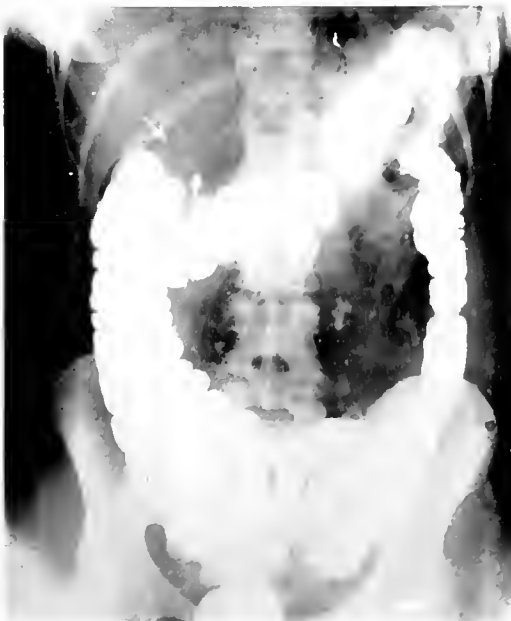
PLATE XXIV

FIG. 76.
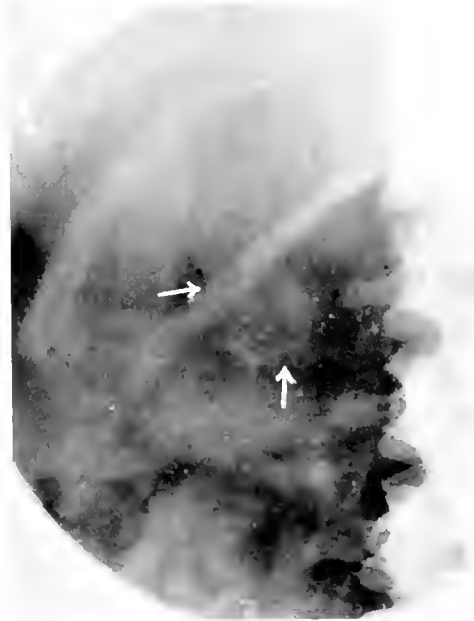

FIG. 77.

FIG. 78.

FIG. 79.

THE PATHOLOGICAL GALL-BLADDER: INDIRECT EVIDENCE

THE changes that take place in the first portion of the duodenum and the second portion of the duodenum have proved to be of definite importance in the diagnosis of the pathological gall-bladder. Too great importance cannot be attached to pressure defects due to the gall-bladder upon the first portion of the duodenum. Although perhaps it would not be wise in every instance to consider pressure defects as the chief point in the diagnosis, yet it is one of the important signs toward making the diagnosis.

Plate XXV, Figures 80, 81 and 82 are used to show the normal stomach, and the first, second, and third portions of the duodenum. Figure 80 was proved surgically to be normal. This is the absolute normal so far as the relations of the parts of the stomach and duodenum are concerned. Figures 81 and 82 show the extreme variations of the normal second portion of the duodenum. Changes found in Figure 81 may, under certain conditions, be considered abnormal, or these changes may be due to adhesions from the gall-bladder, yet one meets with such changes, especially in an individual who is poorly nourished and has marked ptosis of the abdominal organs. In the absence of other direct or indirect evidence, one must be cautious in laying too much stress on changes similar to those found in Figure 81.

Plate XXVI strikingly illustrates pressure defects due to the gall-bladder on the first portion of the duodenum, fixation and deformity, and change in the position of the second portion of the duodenum due to a pathological condition of the biliary tract.

LA INDICES INDIRECTS DES AFFECTIONS VESICULAIRES

LES modifications qui peuvent survenir dans la première et la seconde portion du duodénum ne sont pas à dédaigner pour le diagnostic des affec-

tions vésiculaires. Il est impossible d'exagérer la signification des déformations que la vésicule peute imprimer. Sans doute il serait téméraire de donner à ce signe la première place, mais il reste très important.

Dans la Planche XXV, figures 80, 81 et 82, servent à montrer l'estomac et les trois portions du duodénum. La norme absolue se trouve dans la figure 80. Elle a été vérifiée chirurgicalement. Les figures 81 et 82 montrent des variations considérables de la seconde portion du duodénum; elles n'ont aucune signification pathologique. Les changements figurés dans la figure 81 peuvent être attribuables à des adhérences avec la vésicule. Ne pas oublier, toutefois, qu'on peut les trouver chez des individus à nutrition défectueuse et sujets aux ptoses. En l'absence de symptômes corroboratifs, on se gardera donc d'y attacher trop d'importance (fig. 81).

La planche XXVI démontre clairement l'effet des compressions de la vésicule sur la première portion du duodénum, les tiraillements, déplacements et autres déformations de la seconde portion à la suite d'un état pathologique des voies biliaires.

SIGNOS INDIRECTOS (DE COLECÍSTITIS)

Las modificaciones que pueden sobrevenir en los dos primeros segmentos del duodeno son realmente útiles para el diagnostico de las colecistitis. Aunque no debe de concederse una importancia excesiva a las deformaciones que la presión de la vesícula ocasiona a veces sobre la porción bulbar del duodeno, es sin embargo un excelente síntoma, pero no el más importante de todos.

Las figuras 80, 81 y 82 de la plancha XXV sirven para mostrar el estómago normal y los tres segmentos del duodeno. La figura 80 corresponde a un caso absolutamente normal, comprobado quirúrgicamente, en cuanto a las relaciones mutuas entre las diversas partes del estómago y del duodeno. Las figuras 81 y 82 enseñan variaciones considerables en la segunda porción del

PLATE XXV

FIG. 80.

FIG. 81.

FIG. 82.

PLATE XXVI

PLANCHE XXVI

PLANCHA XXVI

PLATE XXVI

Lateral view shows definite pressure defect upon the first portion of the duodenum due to a pathological gall-bladder. In the original plates certain shadows suggested the possibility of gall-stones. We also found the ampulla of Vater filled throughout the series. At operation no fixation of the gall-bladder to the duodenum was found. Several gall-stones. Definite thickening of the gall-bladder walls.

PLANCHE XXVI

La vue laterale révèle une déformation tres nette de la première portion du duodénum par la vèsicule malade. Dans les clichés originaux, certaines ombres faisaient penser à des calculs. A travers toute la série nous trouvames l'ampoule de Vater remplie de baryum. A l' operation, la vesicule ne se montra pas adhérente au duodènum. Iy y avait plusieurs calculs et un èpaississement certain des parois de la vèsicule.

PLANCHA XXVI

La vista lateral muestra claramente la presión de la vesicula sobre la primera porción del duodeno. En las placar originales crertas sombras hicieronso spechar la presencia de calculos biliares. La ampolla de Vater apareció llena da bario cu todos los clisés de la serie. La operación descubrió una vesícula de paredes espesas, conteniendo algunos cálculos. No habia adherencias al duodeno.

duodeno que no son, sin embargo, patológicas. Las alteraciones descubiertas en la figura 81 podrían, bajo ciertas circunstancias, considerarse anormales o ser atribuidas a adherencias con la vesícula, pero también pueden encontrarse en sujetos normales pobremente nutridos y afectos de ptosis de las vísceras abdominales. Así pues, en la ausencia de otros signos directos o indirectos, no será prudente conceder demasiada importancia a dichas alteraciones (fig. 81).

Los clisés de la plancha XXVI (demuestran) con toda claridad el efecto de las compresiones de la vesícula sobre la porción bulbar del duodeno e igualmente las deformaciones, desplazamientos y fijación anómala de la segunda porción, consecutivas a los estados patológicos de las vías biliares.

PLATE XXVII

PLANCHE XXVII

PLANCHA XXVII

PLATE XXVII

FIGS. 83 and 84 (both illustrating the same case) and FIGS. 85 and 86 (illustrating a similar case). Subhepatic fixation of the stomach. This change from normal in the position of the stomach and the duodenum is, in some instances, the only indication of pathology in the biliary tract, and such changes should be regarded as a warning to make a more careful study of the gall-bladder region if the examination previously made has seemed negative. Errors may arise even in apparently well-fixed positions of the stomach to the right, so that upon operation no evidence of this fixation will be found. But this is only one of the minor indirect evidences of possible pathology in the gall-bladder.

PLANCHE XXVII

FIGS. 83 et 84. Elles illustrent le même cas. Les figures 85 et 86, un cas analogue. L'estomac est fixé sous le foie. Cette anomalie, ainsi que le déplacement du duodénum, peut-être le seul indice d'un état pathologique des voies biliaires. C'est un encouragement à reprendre les clichés "vésicule" s'ils n'ont pas été concluants. On peut trouver, à l'opération, que l'estomac n'est pas tiraillé à droite, en dépit des apparences. Mais il y a d'autres signes indirects des affections biliaires.

PLANCHA XXVII

FIGS. 83 y 84 se refieren al mismo caso; y la 85 y 86 a otro análogo. Fijación infrahepática del estómago. Esta situación anómala del estómago y duodeno es, en algunos casos, el único indicio del estado patológico de las vias biliares; y debe de considerarse como un estímulo para repetir cuidadosamente el examen de la región vesicular, si las primeras investigaciones fueren negativas. Puede ocurrir también que la intervención quirúrgica, a despecho de las apariencias roentgenográficas, no encuentre el estómago desviado a la derecha ni fijo; pero este signo es uno de los síntomas indirectos menos importantes de las enfermedades biliares.

PLATE XXVII

FIG. 83.

FIG. 84.

FIG. 85.

FIG. 86.

PLATE XXVIII

PLANCHE XXVIII

PLANCHA XXVIII

PLATE XXVIII

FIG. 8-.   Pressure of a moderately dilated pathological gall-bladder by fixation upon the first portion of the duodenum and the pylorus. It will be noted that the pylorus is pulled toward the gall-bladder area. This observation was constant through a series of plates made in this position. It changed only moderately in the upright position. The first portion of the duodenum is elongated toward the liver and fixed.

PLANCHE XXVIII

FIG. 8-.   Pression exercée par une vésicule moyennement dilatée sur le pylore et la portion initiale du duodénum. Le pylore est ancré à la région vésiculaire. Cet état de choses, constant dans tous les clichés de la série couchée, se modifia très peu dans la station verticale. La première portion du duodénum est attirée et fixée au foie.

PLANCHA XXVIII

FIG. 8-.   Muestra la presión ejercida por una vesícula medianamente dilatada sobre el píloro y la primera porción del duodeno. Nótese que el píloro ha sido arrastrado hacia la región vesicular. El primer segmento del duodeno aparece estirado y adherido al hígado. Esta observación fué constante en todas las placas de la misma serie hechas en igual posición; varió ligeramente con el enfermo en la estación vertical.

PLATE XXVIII

FIG. 87.

PLATE XXIX

PLANCHE XXIX

PLANCHA XXIX

PLATE XXIX

Fig. 88.   Defect due to pressure of gall-stones upon the first portion of the duodenum and fixation of the beginning of the second portion of the duodenum.

Fig. 89.   Deformity of the first portion of the duodenum with a pseudodiverticulum due to adhesions from the gall-bladder.

Fig. 90.   Artist's drawing of the same case as is shown in Fig. 89, illustrating changes found at operation.

PLANCHE XXIX

Fig. 88.   Déformation de la première portion du duodénum et fixation du commencement de la seconde par une vésicule calculeuse.

Fig. 89.   Déformation de la première portion du duodénum et pseudodiverticule causé par des adhérences à la vésicule.

Fig. 90.   Dessin montrant ce qu'on trouva à l'opération du malade de la figure 89.

PLANCHA XXIX

Fig. 88.   Deformación del primer segmento del duodeno y fijeza de la porción inicial del segundo producidas por una vesícula calculosa.

Fig. 89.   Deformación del primer segmento del duodeno y pseudo-divertículo, ocasionados por adherencias a la vesícula.

Fig. 90.   Dibujo mostrando lo que se encontro en la operación del caso de la fig. 89.
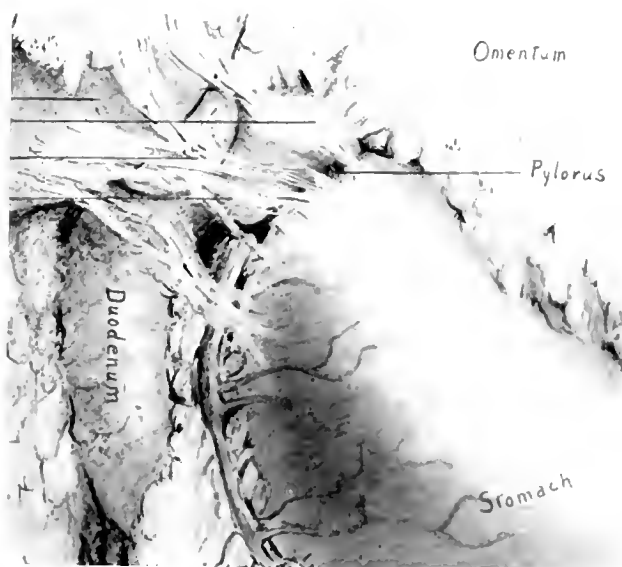
PLATE XXIX

FIG. 88.

FIG. 89.

FIG. 90.

PLATE XXX

PLANCHE XXX

PLANCHA XXX

PLATE XXX

FIG. 91. A constant filling defect of the first portion of the duodenum. Clinically: No evidences of ulcer. Plates are not characteristic of ulcer. Roentgen diagnosis: Pathological gall-bladder with probable gall-stones. Surgically: Pathological gall-bladder with stones.

FIG. 92. Defect of the first portion of duodenum. Opinion passed from this roentgen examination: Chronic ulcer of the duodenum, with gall-stones. At operation, the deformity was found to be due to fixation of the gall-bladder. No evidence of ulcer. Gall-stones.

PLANCHE XXX

FIG. 91. Radiographie d'un individu corpulent montrant un défaut persistant de la première portion du duodénum Pas de symptômes cliniques de l'ulcère. Les clichés non plus n'étant pas suggestifs de l'ulcère, on diagnostiqua: vésicule malade, probablement calculeuse. Confirmé.

FIG. 92. Défaut dans la première portion du duodénum. Diagnostic radiologique: ulcère chronique du duodénum avec calculs biliaires. A l'opération: calculs, adhérences péri-vésiculaires, pas d'ulcère.

PLANCHA XXX

FIG. 91. Laguna persistente de la primera porción del duodeno. No hay signos clínicos de úlcera. Los clisés tampoco son caractirístecos de úlcera. Diagnóstico roentgenológico: enfermedad de la vesícula, probable colelitiasis. Confirmación operatoria.

FIG. 92. Laguna en el primer segmento del duodeno. Diagnóstico roentgenológico: úlcera crónica del duodeno con cálculos biliares. La operación descubrió cálculos y adheencias peri-vesiculares; pero nó lesiones ulcerativas.
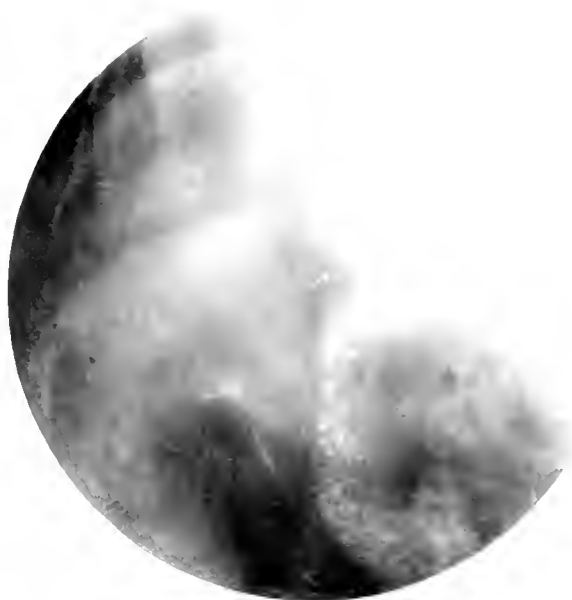
PLATE XXX

FIG. 91.

FIG. 92.

PLATE XXXI

PLANCHE XXXI

PLANCHA XXXI

PLATE XXXI

Figs. 93, 94, 95 (illustrating the same case). Pressure defect upon the first portion of the duodenum, due to gall-stones. In this instance, the gall-stones were not found in the original plates until after the operation although they were plainly visible. Roentgen diagnosis: Probable gall-bladder disease by pressure defect in the first portion of the duodenum.

PLANCHE XXXI

Figs. 93, 94 et 95. Même malade. Les calculs déforment la première portion du duodénum. Ils ne furent aperçus qu'après l'opération, bien qu'ils fussent évidents.

PLANCHA XXXI

Figs. 93, 94 y 95. (Se refieren al mismo caso.) Defecto por compresión de la vesícula calculosa sobre la primera porción del duodeno. Aunque los cálculos eran netamente visibles en los clisés, pasaron sin embargo desapercibidos en su primera lectura; fue después del acto operatorio que una revisión cuidadosa permitió descubrirlos. El diagnóstico roentgenológico había sido: probable enfermedad de la vesícula, supuesta por la compresión y deformación del duodeno.

PLATE XXXI

FIG. 93.

FIG. 94.

FIG. 95.

PLATE XXXII

PLANCHE XXXII

PLANCHA XXXII

PLATE XXXII

Figs. 96 and 97 (illustrating the same case). Visible gall-stones defect, being characteristic of an obstructive chronic ulcer of the duodenum. In the writers' opinion this filling defect of the duodenum was due to chronic ulcer. At operation, gall-stones were found with perforation of the gall-bladder into the duodenum.

Fig. 98. Pressure defect upon the first portion of the duodenum, due to a gall-stone, which was not visible in our examination.

Fig. 99. Lateral view of same case as shown in Fig. 98, showing the same pressure defect.

PLANCHE XXXII

Figs. 96 et 97. Déformation produite par des calculs, mais simulant un ulcère chronique du duodénum. On opta pour l'ulcère, mais l'opération révéla des calculs, avec fistule vésiculo-duodénale.

Fig. 98. Déformation par pression sur la première portion du duodénum, dûe à un calcul qui ne fut pas décelé par la radiographie.

Fig. 99. Même cas, vue latérale (fig. 98). Autre aspect de la déformation.

PLANCHA XXXII

Figs. 96 y 97. (Se refieren al mismo caso.) Deformación producida por cálculos biliares, simulando el aspecto característico de una úlcera crónica y obstructiva del duodeno. En opinión de los autores la laguna del duodeno se debía a una úlcera. La operación descubrió cálculos biliares con perforación de la vesícula dentro del duodeno.

Fig. 98. Deformación del primer segmento del duodeno por un cálculo biliar invisible durante el examen.

Fig. 99. Vista lateral del mismo caso de la fig. 98, mostrando el defecto por compresión.

PLATE XXXII

FIG. 96.

FIG. 97.

FIG. 98.

FIG. 99.

PLATE XXXIII

PLANCHE XXXIII

PLANCHA XXXIII

PLATE XXXIII

FIG. 100.   Illustrates pressure of the gall-bladder, containing stones, with adhesions to the first portion of the duodenum. Confirmed at operation.

FIG. 101.   Pressure of a gall-bladder against the first portion of the duodenum. This plate is republished here to illustrate the type of pressure that the writers feel is important as at least suggestive of the pathological gall-bladder, which might or might not contain gall-stones.

FIG. 102.   Lateral view of a stomach showing pressure of the gall-bladder upon the first portion of the duodenum, and a visible, single large gall-stone. This stone was not visible in the routine gall-bladder examination.

FIG. 103.   Extreme pressure of a large gall-bladder with fixation of the stomach to the gall-bladder. No stones found.

PLANCHE XXXIII

FIG. 100.   Pression exercée par une vésicule calculeuse adhérente à la première portion du duodénum. Confirmation opératoire.

FIG. 101.   Vésicule déformant la première portion du duodénum. Nous pensons qu'une telle déformation est pour le moins très suggestive d'un état pathologique de la vésicule, avec ou sans calculs.

FIG. 102.   Gros calcul découvert au cours de l'examen gastrique et demeuré invisible dans la série prégastrique. On voit la pression exercée sur la première portion du duodénum.

FIG. 103.   Déformation considérable et fixation de l'estomac à la vésicule. Pas de calculs.

PLANCHA XXXIII

FIG. 100.   Compresión de una vesícula calculosa adherida a la primera porción del duodeno; confirmada quirúrgicamente.

FIG. 101.   Compresión de la vesícula sobre el primer segmento del duodeno. Este clisé se reproduce con el fin de mostrar el tipo de deformación que los autores consideran sugestivo de estados patológicos de la vesícula, acompañados o no de cálculos.

FIG. 102.   Vista lateral del estómago mostrando la presión de la vesícula sobre el primer segmento del duodeno. Vése también un cálculo solitario grande. Esta piedra pasó inadvertida en el examen regular de las vias biliares.

FIG. 103.   Deformación considerable y fijación del estómago a una vesícula volumi nosa. Ausencia de cálculos.

PLATE XXXIII

FIG. 100.

FIG. 101.

FIG. 102.

FIG. 103.

PLATE XXXIV

PLANCHE XXXIV

PLANCHA XXXIV

PLATE XXXIV

Fig. 104. Fixation of first portion of the duodenum to a pathological gall-bladder.

Fig. 105. Illustrates the direct, the indirect, and the secondary manifestations of pathology in the biliary tract. It is to be noted that the jejunum is transferred from its normal position on the left to the upper right quadrant. There is a marked deformity of the first portion of the duodenum, suggestive of ulcer, found to be due to adhesions, for the most part. The pathological gall-bladder is found in the original plates.

Fig. 106. Gall-bladder of case illustrated in Fig. 105 after removal, before being opened. Full of stones of such character that they will not in themselves cast a shadow. It is to be noted that the contained bile is denser in character than the gall-stones themselves.

PLANCHE XXXIV

Fig. 104. La portion initiale du duodénum est ancrée à un vésicule malade.

Fig. 105. Illustrant les signes directs, indirects et secondaires des états pathologiques de la vésicule. Noter que le jéjunum, au lieu d'être à gauche comme d'habitude, est dans l'hypochondre droit. Déformation considérable de la première portion du duodénum suggérant un ulcère, mais dûe en majeure partie à des adhérences. Sur le cliché original on voit la vésicule malade.

Fig. 106. La vésicule du cas précédent (fig. 105), extirpée, mais pas encore ouverte. A cause de leur composition, les calculs qui s'y trouvent ne portent pas d'ombre appréciable. Noter que la bile est plus opaque que les calculs.

PLANCHA XXXIV

Fig. 104. Primera porción del duodeno adherida y fija a la vesícula enferma.

Fig. 105. Demuestra los signos directos, indirectos y secundarios de los procesos patológicos biliares. Nótese que el yeyuno ha sido traspuesto al hipocondrio derecho. Hay notable deformación del primer segmento del duodeno, como en las úlceras, pero en este caso producida mayormente por adherencias. Sobre los clisés originales se nota la vesícula enferma.

Fig. 106. Vesícula del caso anterior después de extirpada, pero sin abrir. Llena de cálculos de composición química tal que no pueden proyectar sombra apreciable. La bilis es mas opaca que los cálculos.

PLATE XXXIV

Fig. 104.

Fig. 105.

Fig. 106.

PLATE XXXV

PLANCHE XXXV

PLANCHA XXXV

PLATE XXXV

Fig. 107. Adhesions due to the pathological gall-bladder and chronic ulcer of the duodenum.

Fig. 108. Artist's drawing of case shown in Fig. 107, illustrating the changes found in this type of case.

PLANCHE XXXV

Fig. 107. Adhérences consécutives à une affection biliaire; ulcère chronique du duodénum.

Fig. 108. Dessin figurant ce qu'on trouve dans des cas comme celui de la fig. 107.

PLANCHA XXXV

Fig. 107. Adherencias consecutivas a una afección biliar y úlcera crónica del duodeno.

Fig. 108. Dibujo figurando lo que se encontró en el caso de la fig. 107.

PLATE XXXV

Fig. 107.

Fig. 108.

PLATE XXXVI

PLANCHE XXXVI

PLANCHA XXXVI

PLATE XXXVI

Plates XXXVI and XXXVII illustrate a very important sign which, when present, is indicative of the pressure of a moderately dilated or distended and thickened gall-bladder, or a gall-bladder full of stones that rests against the antrum of the stomach. This change is so characteristic, when found, that to the writers it becomes one of the most important indirect signs.

Fig. 109. Pressure defect of the pathological gall-bladder upon the antrum of the stomach. Confirmed at operation.

Fig. 110. Pressure defect upon the antrum of the stomach. In the original plates it was thought possible to see small shadows within this area which indicated small stones. At operation, the pathological gall-bladder and several very small stones were found.

PLANCHE XXXVI

Les planches xxxvi et xxxvii illustrent un signe très précieux qui origine de la pression d'une vésicule modérément dilatée ou épaissie ou calculeuse sur l'antre pylorique en contact avec elle. Ce signe a une importance que nous estimons capitale.

Fig. 109. Pression exercée par une vésicule malade sur l'antre pylorique. Vérifié à l'opération.

Fig. 110. Déformation du pylore par pression extérieure. On crut apercevoir, dans le voisinage, deux petites ombres suspectes. A l'opération: vésicule malade contenant plusieurs très petits calculs.

PLANCHA XXXVI

Los roentgenogramas de las planchas xxxvi y xxxvii ilustran un signo muy importante, efecto de la presión de una vesícula moderadamente dilatada o de paredes gruesas y distendida o repleta de cálculos, apoyándose contra el antro pilórico. Es una alteración patológica tan característica que los autores la consideran como uno de los signos indirectos mas importantes.

Fig. 109. Laguna del antro pilórico causada por presión de la vesícula enferma. Confirmación operatoria.

Fig. 110. Deformación del antro pilórico por presión de la vesícula. Se creyó poder distinguir en los primeros clisés pequeñas sombras de origen calculoso dentro de la zona lacunar. La operación descubrió una vesícula enferma conteniendo varios cálculos muy pequeños.

PLATE XXXVI

Fig. 109.

Fig. 110.

PLATE XXXVII

PLANCHE XXXVII

PLANCHA XXXVII

PLATE XXXVII

Fig. 111. Fixation by adhesions of the first portion of the duodenum and antrum of the stomach to the gall-bladder area. Pressure defect upon the antrum of the stomach due to the gall-bladder. Stones visible.

Fig. 112. Pressure defect upon the antrum of the stomach, due to the pathological gall-bladder without stones.

PLANCHE XXXVII

Fig. 111. Tiraillement de l'antre pylorique et du duodénum vers la région vésiculaire. Encoche de compression à l'antre. Calculs visibles.

Fig. 112. Déformation de l'antre pylorique par une vésicule malade non-calculeuse.

PLANCHA XXXVII

Fig. 111. El antro pilórico y la primera porción del duodeno aparecen fijos por adherencias a la región vesicular. La presión de la vesícula causa una laguna del antro pilórico. Cálculos visibles.

Fig. 112. Deformación del antro pilórico por vesícula enferma no calculosa.

PLATE XXXVII

FIG. 111.

FIG. 112.

PLATE XXXVIII

PLANCHE XXXVIII

PLANCHA XXXVIII

PLATE XXXVIII

Fig. 113.   Pressure of the pathological gall-bladder against the antrum of the stomach, also displacement of the first portion of the duodenum.

Fig. 114.   Pathological gall-bladder causing pressure against and displacement of the first portion of the duodenum and a part of the antrum of the stomach.

Fig. 115.   Pathological gall-bladder. (Plate made in six hours.) No visible gall-stones found during gall-bladder examination. Stomach fixed to the subhepatic region without any other indirect or secondary manifestations. During six-hour examination, plates showed this fixation with a group of gall-stones. Plate used, in this instance, to illustrate the pressure of the gall-bladder against the antrum of the stomach.

PLANCHE XXXVIII

Fig. 113.   Compression exercée par une vésicule malade sur l'antre pylorique et déplacement de la première portion du duodénum.

Fig. 114.   Cas analogue au précédent.

Fig. 115.   Vésicule malade. On n'avait pas trouvé de calculs sur les clichés consacrés à leur recherche; on en trouva sur la plaque des 6 heures. L'estomac est ancré sous le foie et son pylore est déformé.

PLANCHA XXXVIII

Fig. 113.   Presión de la vesícula enferma sobre el antro pilórico y desplazamiento de la primera porción del duodeno.

Fig. 114.   Vejiga biliar patológica comprimiendo y desplazando la primera porción del duodeno y parte del antro pilórico.

Fig. 115.   Vesícula enferma (placa de seis horas). El examen roentgenológico especial de las vias biliares no demostró cálculos. Estómago fijado a la región infra-hepática. Ausencia de otros signos indirectos. Además de la fijación, la placa de seis horas muestra un grupo de cálculos. Nótese la presión de la vesícula sobre el antro pilórico.

PLATE XXXVIII

FIG. 113

FIG. 114.

FIG. 115.

PLATE XXXIX

PLANCHE XXXIX

PLANCHA XXXIX

PLATE XXXIX

FIG. 116.   Definite fixation of the second portion of the duodenum to the gall-bladder. In the gall-bladder plates particles of calcium were found within the gall-bladder area. In this plate, we see faintly the calcium shadow within the area of the gall-bladder.

FIG. 117.   Artist's drawing of the case shown in Fig. 116, made at the time of operation. Positive fixation of the second portion of the duodenum to the gall-bladder; the calcium shadows found in the original plates were due to gall-stones.

FIG. 118.   Fixation of the second portion of the duodenum to the gall-bladder. At operation, a small number of very small bilirubin lime stones were found. A, shows faint outline of the gall-bladder.

PLANCHE XXXIX

FIG. 116.   Fixation évidente de la deuxième portion du duodénum à la vésicule. Dans les clichés de la série "vésicule" on trouva des taches calcaires correspondant à son emplacement. On voit ici une ombre assez faible située dans les limites du profil de la vésicule.

FIG. 117.   Dessin fait au cours de l'opération du cas précédent (fig. 116). Les constatations de la radiologie sont confirmées.

FIG. 118.   Fixation de la deuxième portion du duodénum à la vésicule. En A on voit la vésicule faiblement dessinée. A l'opération: quelques petits calculs de bilirubinate de calcium.

PLANCHA XXXIX

FIG. 116.   Fijación evidente de la segunda porción del duodeno a la vesícula. Tanto en los clisés de la serie especial de la vesícula como en éste se ven sombras calcáreas en la zona vesicular.

FIG. 117.   Dibujo del mismo caso hecho durante la operación. Confirma la fijación del duodeno y la presencia de cálculos.

FIG. 118.   Fijación a la vesícula de la segunda porción del duodeno. La operación descubre un pequeño número de diminutos cálculos de bilirubinato de cal. (A) señala el delicado contorno vesicular.
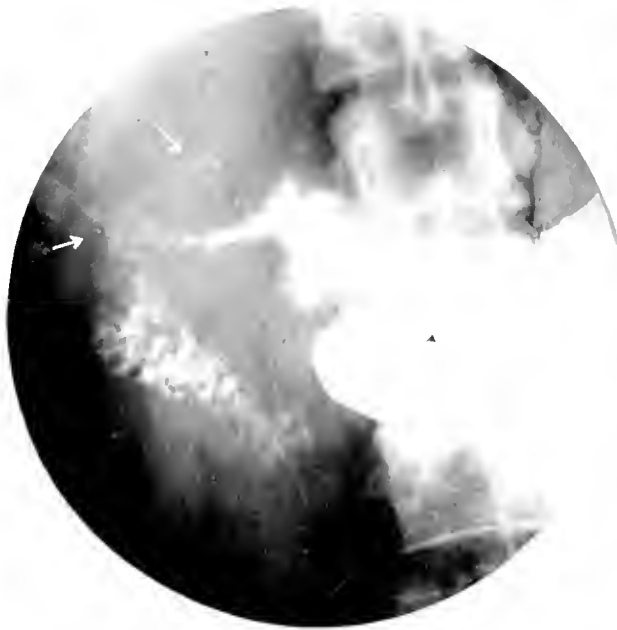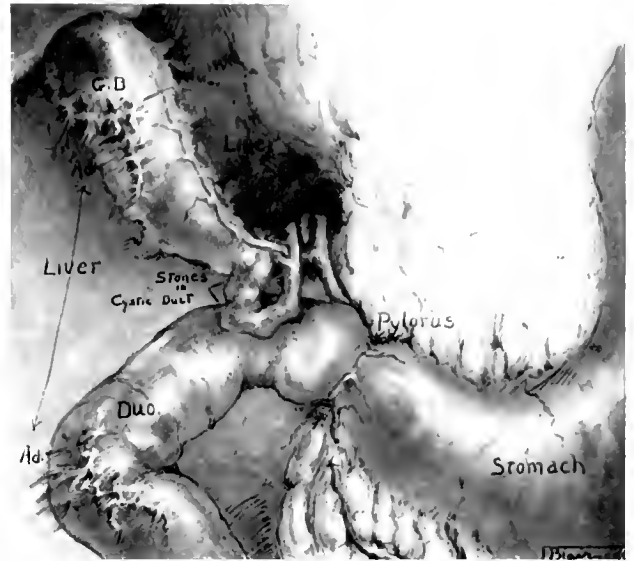
PLATE XXXIX

FIG. 116.

FIG. 117.

FIG. 118.

PLATE XL

PLANCHE XL

PLANCHA XL

PLATE XL

FIG. 119. Pressure defect by the gall-bladder upon the second portion of the duodenum in a woman, aged eighteen. Gall-bladder contained a large number of very small calcium bilirubin stones.

FIG. 120. Deformity of the second portion of the duodenum due to adhesions. Origin of the adhesions was not fully determined at operation.

PLANCHE XL

FIG. 119. Pression exercée par la vésicule sur la deuxième portion du duodénum chez une femme de 18 ans. On trouva un grand nombre de très petits calculs de bilirubinate de chaux.

FIG. 120. Défaut dans la deuxième portion du duodénum, dû à des adhérences dont on ne put déterminer la cause à l'opération.

PLANCHA XL

FIG. 119. Compresión de la vesícula sobre el segundo segmento del duodeno en una joven de 18 años. La vesícula contenía gran número de diminutos cálculos de bilirubinato de cal.

FIG. 120. Deformación del segundo segmento del duodeno, causada por adherencias— La operación no precisó el origen de dichas adherencias.

PLATE XL

Fig. 119.

Fig. 120.

PLATE XLI

PLANCHE XLI

PLANCHA XLI

PLATE XLI

Figures 121, 122, 123 and 124 illustrate the filling of the ampulla of Vater during the barium meal. It has been found, in the writers' experience, that with all other signs absent, when the ampulla of Vater is found full of barium during the meal, it is significant of pathological changes in the biliary tract or within the pancreas. This sign should not be considered a positive indication of disease either of the biliary tract or of the pancreas, but more as a warning that something has been overlooked in the previous gall-bladder examination. One should persist in these cases in looking for direct or indirect evidence of pathology either of the biliary tract or of the pancreas. The errors that may arise in this connection are in occasional cases where a small diverticulum of the second portion of the duodenum or an ulcer with perforation may simulate a barium-filled ampulla.

Fig. 123.   Collection of gall-stones and the ampulla of Vater filled with barium.

Fig. 124.   Barium-filled ampulla in the right lateral diameter (A); pressure of a moderately dilated gall-bladder upon the second portion of the duodenum (B). These two observations together make a reasonably positive diagnosis.

PLANCHE XLI

Les figures 121, 122, 123 et 124 illustrent la pénétration du repas baryté dans l'ampoule de Vater. Dans l'expérience des auteurs, quand tous les autres signes manqueraient, la présence du baryum dans l'ampoule dénote un état pathologique de la vésicule ou du pancreas. Il n'y faudrait pas voir un signe patho gnomonique, mais un avertissement d'avoir à scruter plus attentivement les radiographies déjà prises de la vésicule. Rechercher avec persistance les signes de morbidité dans les voies biliaires ou le pancréas. Il est bon de se rappeler qu'un petit diverticule dans la seconde portion du duodénum ou un ulcère perforant pourraient donner le change et simuler une ampoule remplie de baryum.

Fig. 123.   Amas de calculs. Ampoule de Vater remplie de baryum.

Fig. 124. A, l'ampoule vue en position latérale droite. B, pression par une vésicule moyennement dilatée sur la seconde portion du duodénum. On peut être assez affirmatif quand on a les deux signes.

PLANCHA XLI

Los siguientes roentgenogramas (figs. 121, 122, 123 y 124) ilustran la penetración de la comida opaca en la ampolla de Vater. Es la creencia de los autores que, en la ausencia de otros síntomas, esta penetración es signo probable de un estado morboso de las vias biliares o del páncreas. No es un síntoma de certeza, sino mas bien una señal de alerta de que algo pasó desapercibido durante los exámenes previos y de que es necesario persistir en la investigación de los signos directos o indirectos de las afecciones biliares o pancreáticas. No se olvide, sin embargo, que un pequeño divertículo de la segunda porción del duodeno o una úlcera perforante pueden simular la ampolla de Vater llena de bario.

Fig. 123.   Colección de cálculos y ampolla de Vater llena de bario.

Fig. 124.   (A) la ampolla de Vater, llena de bario, vista en pocición lateral derecha. (B) Segunda porción del duodeno comprimida por una vesícula moderadamente dilatada. Con estos dos signos puede aventurarse un diagnóstico positivo.

PLATE XLI

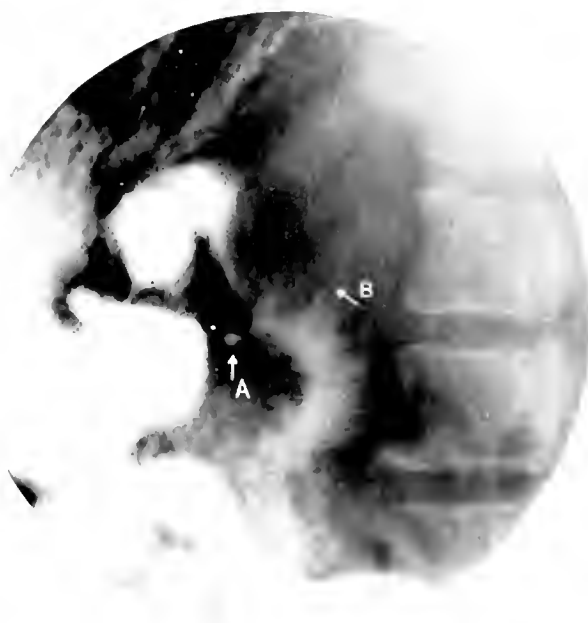FIG. 121.

FIG. 122.

FIG. 123.

FIG. 124.

PLATE XLII

PLANCHE XLII

PLANCHA XLII

PLATE XLII

FIG. 125. Jejunum transferred from the left to the right upper quadrant. This change is significant of one of two things: it is due either to adhesions in the upper right quadrant or to changes which are the result of tubercular peritonitis in early life. Occasionally, tumors in the upper left quadrant, such as hypernephroma of the kidney or a markedly enlarged spleen, will displace the jejunum to the right. This can be determined by pressure on the stomach, which will be produced by a hypernephroma or an enlarged spleen.

FIG. 126. Postoperative effect upon the stomach causing marked deformity—the result of cholecystotomy. The original plates showed 2 remaining gall-stones. These are not visible in the reproduction.

FIG. 127. Secondary manifestations of probable gall-bladder disease upon the hepatic flexure and the proximal portion of the transverse colon. These changes were confirmed at operation. Similar changes occur commonly in very large and well-nourished individuals, when gall-bladder disease is present; uncommonly in those very poorly nourished.

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FIG. 125. De gauche, le jéjunum a passé dans l'hypochondre droit. Cela peut être dû à des adhérences dans cette région ou à des modifications produites au cours du jeune âge par une péritonite tuberculeuse. Parfois, des tumeurs dans l'hypochondre gauche, comme l'hypernéphrome ou l'hypertrophie de la rate, peuvent produire le même effet. Mais alors, on a des déformations considérables de l'estomac.

FIG. 126. Déformation considérable de l'estomac consécutive à une cholécystotomie. Les clichés originaux montrent deux calculs oubliés. On ne peut les voir ici.

FIG. 127. Contrecoup d'une affection probable de la vésicule sur la coudure hépatique et la portion initiale du transverse. Vérifié à l'opération. Cet état de choses est fréquent chez les malades corpulents, rare chez les amaigris.

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FIG. 125. Yeyuno trasportado desde la izquierda al hipocondrio derecho. Esta modificación patológica puede ser ocasionada, ora por adherencias en la región biliar o bien por lesiones consecutivas a una peritonitis tuberculosa de la infancia. A veces los tumores del hipocondrio izquierdo, como el hipernefroma o las esplenomegalias, desplazan el yeyuno hacia la derecha, pero entonces coexisten deformaciones considerables del estómago.

FIG. 126. Notable deformación del estómago consecutiva a una colecistotomía. Los clisés originales muestran dos cálculos olvidados por el cirujano. No se ven en esta copia.

FIG. 127. Efecto secundario de una afección probable de la vesícula biliar sobre la acodadura hepática del colon y la porción inicial del transverso, confirmado por la operación. Alteraciones análogas son frecuentes en los enfermos corpulentos y robustos; raras en los flacos.

PLATE XLII

Fig. 125.

Fig. 126.

Fig. 127.

PLATE XLIII

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Fig. 128. The more common type of deformity of the hepatic flexure and proximal portion of the transverse colon due to adhesions in the upper right quadrant, both from the gall-bladder and from veils and adhesions of this portion of the bowel. These changes become more important when there is distinct, direct evidence of pathology in the biliary tract.

Fig. 129. Type of spasm which has been found frequently associated with gall-bladder disease. This spasm involves the antrum of the stomach, producing a tubular appearance in the distal end of the stomach for a distance of several inches. It is interesting to note when found with evidence of gall-stones or other pathology of the biliary tract, though in itself it is not an important diagnostic sign.

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Fig. 128. Aspect habituel des déformations de l'anse hépatique et de la portion initiale du colon transverse par suite d'adhérences dans l'hypochondre droit. Elles peuvent avoir une origine vésiculaire ou intestinale. Quand on aura, par ailleurs, des signes d'affection biliaire, ces déformations sont très significatives.

Fig. 129. Type de spasme gastrique fréquemment associé à l'existence des affections de la vésicule. Il étreint tout l'antre pylorique et peut le réduire à l'état d'un simple tube sur une longueur de plusieurs centimètres. Isolément, ce signe n'a pas grande importance.

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Fig. 128. Variedad la mas común de las deformaciones de la acodadura hepática del colon y porción inicial del transverso, producidas por adherencias en el hipocondrio derecho, ya provengan de la vesícula o se deban a franjas membranosas o adherencias intestinales. Cuando coexisten con signos directos de enfermedad biliar, estas deformaciones son muy significativas.

Fig. 129. Variedad de espasmo gástrico frecuentemente asociado a los procesos vesiculares; comprime el antro pilórico y lo transforma en un tubo sobre una extensión de varios centímetros. Importante cuando coincide con otros signos de enfermedad biliar, no tiene por sí sólo gran valor diagnóstico.

PLATE XLIII

FIG. 128.

FIG. 129.

PLATE XLIV

PLANCHE XLIV

PLANCHA XLIV

PLATE XLIV

FIGS. 130, 131, 132 (the same case). Clinically diagnosed as gall-stones. The roentgen examination revealed a group of gall-stones as seen in Fig. 130. Stones the size of gall-stones, and with most of their usual characteristics, were found as clearly defined on the kidney examination as on the gall-bladder examination. The lateral view (Fig. 131) showed the stones in the anatomical region of the kidney. The writers felt that unless there was some very unusual anatomical rearrangement of the gall-bladder, kidney, and stomach, these shadows, for the most part at least, must be within the kidney. For various reasons it was impossible to cystoscope this case and inject the kidneys. In spite of the facts obtained by this examination and the probability that these were, in the most part, stones within the kidney, the case was operated upon as a case of gall-stones. No evidence whatsoever of pathology was found within the gall-bladder. The kidney was explored and removed. Fig. 132 shows the kidney with these stones within the kidney substance. This case and the series of plates illustrate the value of the right lateral view in determining whether or not a suspected stone or stones are located in the normal position for the gall-bladder or kidney. In a large percentage of cases, the lateral view will determine whether the shadows are of the gall-bladder or its contents, or whether they are of the kidney.

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FIGS. 130, 131, 132. Même cas. Diagnostic clinique: lithiase biliaire. La radiographie (Fig. 130), montra des calculs. La radiographie du rein en montra d'analogues. Un cliché en position latérale (fig. 131), fit voir qu'ils siégeaient dans la loge rénale. On dut conclure qu'à moins d'anomalie anatomique, ces ombres, pour la plupart, devaient être dans le rein. Pour diverses raisons on ne put faire une pyélographie. En dépit des constatations, on décida d'explorer la vésicule. Elle était absolument normale. On enleva le rein; la figure 132 le montre avec son contenu. Tout ceci prouve l'utilité de la vue en latérale droite quand il s'agit de rapporter des calculs au rein droit ou à la vésicule biliaire.

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FIGS. 130, 131 y 132. Se refieren al mismo caso. Diagnóstico clínico; colelitiasis. Los roentgenogramas de la vesícula (fig. 130) revelaron un grupo de cálculos de tamaño y estructura semejantes a los biliares. Los roentgenogramas del riñón también revelaron cálculos similares. La radiografía lateral, sin embargo (fig. 131), mostraba los cálculos en la región renal. Se opinó que, salvo alguna anomalía anatómica, las sombras, cuando menos en su mayor parte, eran de origen renal. Por circunstancias especiales no se hizo una pielografía. A pesar de los signos en contrario, se decidió explorar las vias biliares, que resultaron completamente normales. Entonces se practicó la nefrectoméa derecha. La figura 132 muestra la imagen de dicho riñón conteniendo los cálculos denunciados por los anteriores roentgenogramas. Hechos semejantes prueban la capital importancia de la radiografía en posición lateral derecha para diferenciar los cálculos biliares de los renales. En una gran proporción de casos ella decidirá si las sombras son de la vesícula o si contenido, o si proceden del riñón.
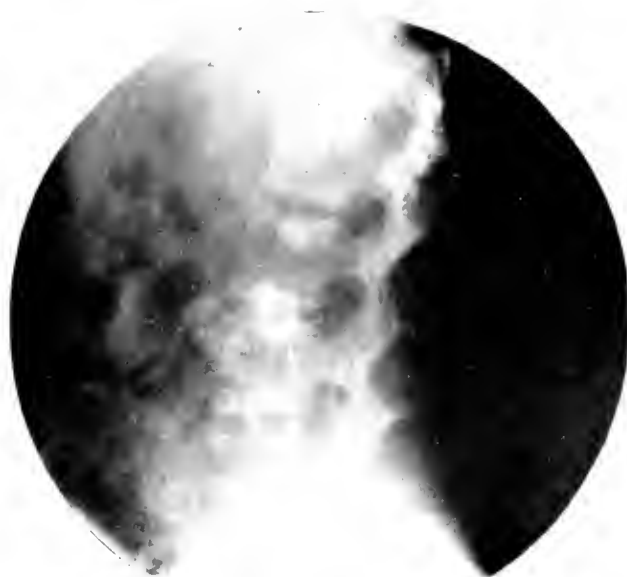
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Fig. 130.

Fig. 131.

Fig. 132.

Date Due